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ROBERT GROSSETESTE'S INTEREST
IN
NATURAL SCIENCES AND LANGUAGES.

A thesis submitted in partial satisfaction of the
requirements for the degree of
Master of Letters
at the University of California

by

UNIV. OF
CALIFORNIA

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FOREWORD

This thesis is an outgrowth of the Seminar in Medieval History conducted at the University of California by Professor L. J. Paetow during the Academic year 1912-1913. The work of the Seminar, while concerned with the intellectual life of the Thirteenth Century as a whole, centered very largely on the work of two men, Roger Bacon and Robert Grosseteste; and it was on the latter that my interest was especially focused.

For the inspiration of that Seminar which led me to this special study, I am truly grateful; and to Professor Paetow himself, whose kindly interest in my work never failed, and whose assistance served to render clear many perplexing points, I gladly pay a tribute of gratitude.

Harry S. Willett.

Berkeley, California.

December, 1913.

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CHAPTER I

THE TWELFTH CENTURY RENAISSANCE

AND

THE OXFORD SCHOOL

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Chapter I

To the historical student of fifty years ago the word "Renaissance" was indissolubly bound up with a fifteenth century movement--the great Renaissance. Today the historian can tell of several such awakenings. Now we speak almost as readily of the "Twelfth Century Renaissance" as we do of the later and more famous movement. The twelfth and thirteenth centuries are being freed from the charge of intellectual darkness, and we are coming to see in them a very important era in the history of learning.

It is probably not quite correct to call the intellectual movement of this period the "Twelfth Century Renaissance", as it was by no means confined to the twelfth century. It did not culminate until well along in the thirteenth century, while some of its causes clearly antedate eleven hundred by many years. A better political order in Western Europe, a strengthening and reforming of the papacy together with monastic reforms, the opening up of new interests as a result of the Crusades, a strengthening of civic life and community feeling--all these causes and others tended to bring about such conditions as to make intellectual progress possible and natural, and, as a result of them, this Twelfth Century Renaissance made its influence strongly felt.

The movement was not wholly a breaking away from the old order. The Seven Liberal Arts[1] continued to be studied; they felt the effects of the new impetus and were carried along by it, but other branches of learning also, largely neglected in the eleventh and preceding centuries, now shared in the general awakening. The classics received again far more attention than for years they had been receiving, and there was some promise that now they would come into their own. Chartres, and later Orleans became famous as seats of Classical Culture, and until far into the thirteenth century a fight was waged in behalf of the ancient Latin literature. It was a losing fight, however, as other and newer subjects crowded the classics out of the place that had been demanded for them. Some of the new universities, particularly Paris, superceded Chartres and Orleans in popular estimation, and subjects very different from literature gained most favor.

Logic, in the course of this intellectual revival, branched out into Metaphysics and systemmatized theology, civil and canon law found their way into the curricula of many schools, while there were signs that even science, so grieveously neglected in the preceding century, was to receive far better treatment in the immediate future. Some of these favorable promises, however, were never realized. Just as the impetus to the study of the classics proved to be only a temporary thing, so the hope of a continued renaissance was only transient. The thirteenth century may with much truth be

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[1] The Seven Liberal Arts were divided into two groups, the Trivium and the Quadrivium. The Trivium consisted of Grammar, Rhetoric, and Logic; while the Quadrivium was made up of Arithmetic, Geometry, Astromomy, and Music. For full discussion of them see Abelson, "The Seven Liberal Arts." New York, 1906.

called a scientific century, but after that the interest in science lagged again and was not really awakened till the fifteenth century.

The universities of the thirteenth century, with their power and repute greatly heightened by the renaissance of the twelfth, became splendid institutions and reflect no little luster on their age. Theology, philosophy, law, medicine, dialectic, were the chief studies pursued; languages and literature were largely neglected, while the natural sciences, though they awakened much interest in certain quarters, still played a comparatively small part in university work. The justification for calling this century a scientific century is found in the works of such men as Alexander Neckam[1], Albertus Magnus, Roger Bacon, Peter of Maricourt[2], Robert Grosseteste and a host of others who, little as we know of some of them, bear abundant witness that a spirit of investigation and scientific interest was thoroughly awake.

This interest had received a strong impetus from the introduction of the "New Aristotle[3]". Up to this time, Aristotle had been known to the Latins almost solely through his logic. In this field he had been the dominating power, the master, or "the Philosopher", as he was commonly called; his logical treaties had been the authorative texts for the study of Dialectics in the eleventh century, but his other works were very slightly known. Now a great change took place and as a result of it, a much more prolific Aristotelian literature was made accessible to Western Europe.

The entrance of these new wotks came about through two channels,-one from the South and one from the East.- In the eighth and ninth centuries the Arabs of the East had very largely taken over Greek learning, and the schools of Bagdad were thoroughly impreg-

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[1] Alexander Neckam(1157-1217),English school-man and scientist born at St. Albans, was educated at St Albans' Abbey School and taught near there. In 1180 he was a famous lecturer at Paris, but by 1186 he was back again in England. Became an Augustinian Canon and was appointed Bishop of Cirencester in 1213. Though a theologian and a grammarian, his name is chiefly connected with Natural History and Nautical science. In his "De Naturis Rerum" and his"De Utensilibus" he has perserved to us the earliest European notices of the Magnet as a guide to seamen.

[2] Peter of Maricourt: A French savant of the thirteenth century to whom Roger Bacon pays high tribute in his "Opus Tertium" and in other works. Bacon depicts him as a recluse who devoted himself to the study of nature, who was able to work metals, who invented armor, etc.(Opus Tertium, Edition Brewer; Rolls series No.15,1859.Chapter XIII,pages 43-47).Charles in his life of Roger Bacon,had identified this Peter of Maricourt as Peter Peregrinus of Picardy,one of whose letters,"De Magnete",has been printed in Libri's Histoire des Sciences Mathematiques in Italie Volume II (1838)

[3] For the best discussion of the "New Aristotle" see Mandonnet, "Siger de Brabant" Volume I. (Louvain 1911, Chapter I and II, Pages I-64.

nated with Aristotelianism. By Moslem scholars Greek books were translated into Arabic, and Mathematics and Natural Philosophy especially, were studied with great interest.- From the Arab East this learning was transmitted to Spain, and from Spain it was carried to Northern Europe in the early years of the thirteenth century, bringing to the schools there many treatises of Aristotle which had hitherto been unknown to them. The influence of these new treatises, however, was not purely Aristotelian. They were Arabic translation, and were frequently accompanied by Arabic commentaries, especially those of Avicenna and Averroes which in many cases greatly modified the original teachings of "the Philosopher".

The other channel for the introduction of the "New Aristotle" was more directly from the East. After the Latin conquest of Constantinople in 1204, the original home of Greek learning was open to Western Scholars. By the Crusades and by the new contact between East and West, many students had had their attention and their wanderings turned eastward, and it was inevitable that some of these scholars should avail themselves of the opportunities to carry the newly discovered learning home with them. In this way many Aristotelian treatises entered Western Europe, supplementing the Graeco-Arabic manuscripts that were being brought up from the South.

As a result of these two currents, within a half ~~a~~ century practically all of the extant works of Aristotle were laid open, and especially at Paris which was distinctly the center of the intellectual life of this period, they were eagerly seized upon. Now not merely the Logic, but also the Physics, the Metaphysics, the Ethics, the Scientific writings, well nigh the whole body of Aristotelian treaties, were in the possession of Western Europe and were pregnant with power to revolutionize the intellectual life of the Latins.

With the introduction of these hitherto unknown works, a very vital question arose. Would the Church accept the "New Aristotle"?- It is a trite saying to assert that the Church very largely controlled the intellectual activities of the middle ages; but the triteness of the saying does not detract from its truth. Education was ecclesiastical, and ecclesiasts dominated education. This being the case, it is obvious that the church would very carefully supervise the teachings of the schools and universities. Subjects and doctrines inharmonious with Christian tenets would necessarily come under the ban. So in spite of the intellectual advance that Aristotle's newly discovered works represented, it is not surprising that they encountered bitter opposition. In the first place, to the Latin Churchmen "thePhilosopher" was a pagan; and there had long been a strong clerical antipathy against pagan philosophy and literature, a truth which in part accounts for the decline of the classics in the thirteenth century. This alone, however, would probably not have been enough to bring Aristotle's works under condemnation, as is evinced from the fact that the logic had so long remained supreme and unassailed. But there were specific charges to be brought against his Metaphysical and his Scientific writings. Unquestionably there

were in his original treatises, and especially in the Arabic versions of them and the Arabic commentaries upon them,many ideas that were not consistent with church dogma. Moreover it was the anti-christian doctrines that seemed to be most emphasized by Avicenna and Averroes, and their commentaries upon "the Philosopher"brought out these elements far more explicitly than he himself had done. As a result, these teachings in the early years of their introduction, had a disastrous effect in creating a wave of skepticism, especially among the school men at Paris.

The Church could not fail to be cognizant of this danger and to take steps against it. Hence interdictions[1] against the reading or teaching of Aristotle's scientific and metaphysical works were issued and without a doubt did momentarily arrest the progres of study along these lines. It was, however, only a temporary retardation. The ecclesiastical decrees were not repealed, but for some reason or another they were laxly enforced. Mandonnet holds the theory[2] that the Church hardly knew how to act. By an uncompromising hostility to Aristotle, not only many churchman of scholarly bent would have been offended, but also much knowledge of actual value have been made inaccessible. But on the other hand, to have removed the interdictions would have offended an even greater number of adherents of the Church who had not fallen under the spell of the new learning. Hence an attitude of compromise was assumed; the early prohibitions were not repealed, but scholars were allowed to infer that they would not be rigorously enforced.

Be that as it may, it is undeniable that the study of Aristotle's metaphysical and scientific treatises made great progress. By 1255 we find practically all of his writings in use at Paris and prescribed by a statue of the faculty of the university as text books for its masters, while his authority in these new studies was almost as supreme as it long had been in the realm of logic. Moreover, not Paris only had come to know these new treatises. To a smaller degree they also were the possession of the other universities of Western Europe; and the knowledge that they brought,together with the investigating spirit that it aroused, did much to make the thirteenth century a century of scientific interests.

We need not here consider the influence of the "New Aristotle" after 1255; nor is it necessary to go into greater detail concerning the general intellectual attitude of this period. Enough has perhaps been said to give some general impressions of the state of learning at this time and to create a background against which the work of one man may be thrown. That one man, while he doubtless had some relations with the universities of Paris, was more particularly a child of the English University, and for that reason it seems necessary to touch very briefly upon the work of the English school.

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[1] The first interdiction was in 1210, followed by others in 1215, 1231 and 1263.

[2] Mandonnet, "Siger de Brabant" Vol. I, pages 25-26

The University of Oxford was by no means as old as her rival school at Paris, and at this period was of far less importance than the French University; but still it soon came to exercise a wide influence in certain intellectual fields. At first, because Oxford in its origin as a university was probably an offshoot from Paris,[1] a very close connection existed between the two schools; and, generally speaking, whatever subjects were studied at the French University were also pursued at the younger school in England. That, however, does not mean that the Oxford curriculm was a mere slavish following along lines laid down at Paris, as such was by no means the case. Oxford was very fortunate in some of her earliest teachers in that they were men of wide view point and vital powers, -not of a type that would consent to follow blindly accepted courses, but that would rather dare to branch off into independent channels. Scholastics they were, of course, and yet they were more than mere scholastics in the ordinarily accepted sense of the term.

To the Thirteenth Century belong several of the most important of these teachers. Edmund Rich, later archbishop of Canterbury, was one of them; the master distinguished as the first recorded teacher of the "New Logic" at Oxford and as the first student recorded as having taken the degree of Doctor of Divinity there.But he, in spite of his unquestioned learning, is better remembered for his beautiful character and his saintly life than for his achievements in the realm of education.

Following him, and in fact finding inspiration in the opportunities resulting from the coming of Franciscan scholars to Oxford, is a little group bound together by ties of mutual interest and mutual purpose. To this group, in which there were at least three prominent members and several minor members, Felder[2] has given the name "Oxford School",and it exercised a very powerful influence over the intellectual side of Franciscan life.

Of the three prominent members of this little coterie, the one best known is Roger Bacon, himself a member of the Franciscan order and probably the most remarkable of its students. Few men of his day saw more clearly than he the dangers and weaknesses of Scholasticism, and few departed further from its ordinary method and channels, though he did not escape from it altogether. He by no means wholly neglected Theology, Metaphysics and Speculative reasoning, but his greatest achievements were in the realm of Mathematics and Natural Science. As one who championed independent observation and experiment and would not be held in check even by the authority of the "Philosopher", he holds a noteworthy place in the history of medieval thought. His interest in the study of languages, his

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[1] Rashdall, "Universities of Europe during the Middle Ages". Vol II, Pages 329-332.

[2] For Felder's discussion of the Oxford School see his "Geschichte der Wissenschaftlichen Studien im Franziskanerorden bis um die Mitte des 13 Jahrhunderts". Chapter IV pages 254-304

works in Biblical criticism, his achievements in Science and Mathematics, his striking originality, were indicative of a decidedly progressive mind and merit much of the credit that has been given to him as the most remarkable man of his century, a scholar far ahead of his age.

A second member of this "Oxford School", slightly earlier in date than Bacon, was Adam Marsh, or Adam de Marisco, also a member of the Franciscan order. He was the first Franciscan who lectured at Oxford[1] and we know that he lectured on Theology to the members of his own order there. He must, however, be judged largely by the esteem in which he seems to have been held by his contemporaries and those closely following him, as no works from his pen have come down to us save some of his letters[2], and these give no detailed information in regard to his scholarly attainments.

"Doctor illustris" and "Doctor mirabilis" were terms often applied to him. Matthew Paris calls him "literatus"[3]; Robert Grosseteste refers to him in very complimentary language[4] and at one time voices a fear lest the University of Paris might win him away from Oxford[5]; while Roger Bacon, probably his pupil, calls him one of the greatest clerks of the world and "perfect in all wisdom"[6]. Bacon also refers specifically to his attainments in Philosophy[7], Mathematics[8] and languages[9], so that we can readily see how common interests bound them together. With these evidences then, we must surely give him credit for considerable wisdom, though even aside from his learning and his reputation as a churchman, he was a figure of some little influence at the English Court[10].

Antedating both of these scholars, though only by a few years, and in many ways serving as their master and their inspiration, was Robert Grosseteste, Chancellor of the University and later Bishop of Lincoln, not as well known as Roger Bacon and yet perhaps doing a pioneering work that, if not as striking as that of the Franciscan, was almost as important and worthy of commendation. As the particular man with whom this paper is most concerned, his work and influence will be more fully treated in later chapters and need not here be dwelt upon. Suffice it to say that his breadth of interests, his keennees of intellect and his progressive aspiring spirit mark him as a very worthy center of the "Oxford School".

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[1] "De Adventu Minorum" in "Monumenta Franciscana", Vol.I, page 38

[2] Published in Monumenta Franciscana. Vol.I. Ed. Brewer in Rolls Series No. 4. 1858, pages 75-491.

[3] Chronica Majora. Ed. Luard; Rolls Series, No.57. Vol.V, page 619

[4] For examples of such complimentary tributes, see Grosseteste's Epistles, Nos. 9, 20, and 99

[5] Epistle CXIV, page 334

[6] Opus Tertium, page 75. Brewer's Edition of Opera Inedita.

[7] Opus Tertium, page 70

[8] Opus Majus, Ed. Bridges, Vol. I, page 108

[9] Opus Tertium, page 88

[10] For a biographical sketch of Adam Marsh see Little's "Grey Friars at Oxford", pages 134-139.

CHAPTER II

GROSSETESTE'S CAREER AS A SCHOLAR

Chapter II

If our judgment of Adam Marsh must be formed very largely by the opinions that his contemporaries and immediate successors expressed in regard to him, because no extant work of his tells us about his attainments, this is not the case when we ask ourselves who was this Robert Grosseteste? A considerable number of his treatises of various sorts have come down to us, and from them alone we might form a fairly good idea of the man and of his work. But still, were these writings lacking, and were we forced to judge him in the same way by which Adam Marsh was judged[1], we could find many contemporary opinions to guide us in our effort. And also other opinions are open to us, which, if not absolutely contemporary, are still the judgments of those so closely following his time that they can be accepted, not perhaps at their full face value, but with a fair degree of confidence.

Apparently this man stood very high in the estimation of those who knew him. As Bishop of Lincoln (1235-1253), his activities as a churchman naturally brought him into prominence, and it would be easy to quote many tributes to his abilities as a theologian and to his splendid character; but as this paper is not particularly concerned with his career as a churchman, only such quotations will be given here as deal in part at least, with his more distinctly scholarly attainments.

None spoke more highly of him than Roger Bacon, his pupil and friend. Besides grouping Grosseteste with Adam Marsh as among those greatest clerks of all the world, "perfect in all wisdom both divine and human"[2], he pays him these glowing tributes. "No one wholly knew science, except the Lord Robert, Bishop of Lincoln, by reason of the length of his life, his experience, study and diligence. He knew mathematics and perspective, and there was nothing which he was unable to know"[3]. Again, "There were found some famous men such as Robert, Bishop of Lincoln, and Adam Marsh, who were capable of unfolding the causes of all things and of giving sufficient explanations, both of human and divine phenomena, asthe writings of these men amply prove"[4]. Once more, "And only Lord Robert called Greathead, knew the sciences"[5]. And again "Few attained to consummate wisdom in the perfection of philosophy; Solomon attained to it and Aristotle in relation to his time, and in a later age Avicenna, and in our own day the recently deceased Robert, Bishop of Lincoln, and Adam Marsh"[6]. Many others might be given, but these will suffice as far as Bacon is concerned.

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[1] See Chapter I, page 5 and 6

[2] Opus Tertium, page 75

[3] Ibid, page 91

[4] Opus Majus, Ed. Bridges, Vol. I, page 108

[5] Ibid, Vol. I page 67

[6] Opus Tertium, page 70

As Grosseteste's name is so frequently linked with that of Adam Marsh, it is interesting to know in what light this Franciscan teacher regarded the good bishop, especially since mention has already been made of the high esteem in which Grosseteste held him[1]. He cannot be quoted as freely as Bacon, probably because we have so few of Marsh's writings in which to search for fitting citations, but still in his "Epistles" there are many references to Grosseteste. Indeed a large number of these letters are directly addressed to the Bishop of Lincoln and breathe a profound respect for him.

The strongest words of a complimentary nature that we find from Adam de Marisco are tributes to Grosseteste's moral and spiritual character[2] or are in connection with his works as a churchman; there are few paragraphs in which his merits as a scholar are definitely extolled. And yet, by reading between the lines, we can catch a glimpse of that side of the prelate's life and of the high regard which the Franciscan had for his scholarly attainments. In many places reference is made to Grosseteste's connection with Oxford and to his great influence there[3]; in other places Marsh either requests or comments upon books or manuscripts that are of mutual interest to them[4]; again favors are asked or aid is desired for certain of his novices in order that they may pursue their studies[5]; now he tells Grosseteste that the Earl of Leicester is planning to entrust to him the education of his son[6]; and again in anxious tone he expresses fear for the Bishop's health and urges that he relax in the intensity of his studies[7]. These references, and others that might be cited, are but little hints, and yet, considered in their entirety, they form a valuable means of throwing light on Grosseteste as a scholar, and possibly are more trustworthy than Bacon's somewhat fulsome praise.

Eccleston in his "De Adventu Minorum"[8] speaks of Grosseteste as an instructor of priests, referring particularly to Peter of Tewksbury[9] whom, he says, was "enriched by the special love of Lord Robert of Lincoln from whom he often learned many of the secrets of wisdom".

Matthew Paris calls him[10] "an open confuter of both our Lord Pope and the King, a reprover of prelates, the corrector of monks, the director of priests, the instructor of clerks, the supporter of

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[1] Chapter I, page 6

[2] See Adam Marsh's Epistles in Monumenta Franciscana. Vol. I. Ed Brewer 466 and 487.

[3] Ibid, pages 99-100,135,248 Et alia.

[4] Ibid, pages 110,114 Et alia.

[5] Ibid, pages 93,136,176 Et alia .

[6] Ibid, page 110

[7] Ibid, page 143

[8] Monumenta Franciscana, Vol. I. page 64

[9] Peter of Tewksbury was a friend of Grosseteste and later was the fifth minister of the Franciscans in England. At one time (C1245) he was custodian of the Franciscan Convent at Oxford. For a biographical sketch see Little's "Gray Friars at Oxford", page 127

[10] Chronica Majora V. page 407

scholars, a preacher to the people, a persecutor of the incontinent, an unwearied investigator of varying texts of Scripture, a hammerer and despiser of the Romans". And again[1] he quotes the cardinal Giles de Torres[2] and other cardinals as telling the Pope that Grosseteste "is considered a great philosopher, fully learned in Latin and Greek letters, a zealot for justice, a lecturer on theology in the schools, a preacher to the people, a lover of purity and a persecutor of Simonists". These words combine tributes to the scholarly side of the man and to his more distinctly ecclesiastical side as well, and coming from Matthew Paris, who in some ways showed little regard for Grosseteste as a churchman and quite strongly condemned the strictness which marked the performance of his episcopal duties, they must needs be taken as tributes well merited and not as the exaggerated praise of an over-enthusiastic friend.

In the following century we find Lincolniensis quoted and used as a champion by both sides in the great Wiclifian controversy. Wiclif himself speaks[3] of him as a philosopher greater than Aristotle while Tyssington[4], though an opponent of Wiclif, in figurative speech says, "To compare Grosseteste with modern doctors is like comparing the sun to the moon when the latter is eclipsed"[5].

Other tributes might be cited, especially such as can be found in the correspondence resulting from the fourteenth century attempt to secure the canonization of Grosseteste, but these should be sufficient to stamp the man as one more than a mere churchman and more than a mere scholastic. They certainly are sufficient to arouse a question in our minds when we notice that more modern writers have given him no such praise and have paid comparatively little attention

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[1] Chronica Majora V, page 407

[2] On this occasion the cardinals were seeking to mollify the anger of the Pope (Innocent IV) because Grosseteste had refused to sanction the appointment of the Pope's nephew Frederick di Lavagna, to a canory at Lincoln.

[3] Wycliffe; Trial, IV Chap. 3, (Quoted by Stevenson in his "Robert Grosseteste, Bishop of Lincoln".)

[4] Tyssington (John Tyssington), died c.1395. A Franciscan, Regent Master of the Friars Minor in 1381, when he was one of ten doctors to subscribe to the decree of Chancellor Berton condemning Wiclif's twelve "Conclusions" on the Sacraments. Shortly after this he issued a treatise containing an elaborate reply to Wyclif's "Confessio" on Transubstantiation, entitled "Confessio contra confessionem Johannis Wiclif". This treatise was at the time considered of great value to the Wiclifian controversy.

[5] Shirley's "Fasciculi Zizaniorum". page 135. (Quoted by Stevenson)

to Grosseteste, the scholar; their judgment has seemed quite different from that of his contemporaries. To Adam Marsh, to Roger Bacon, to Matthew Paris, Grosseteste was a great theologian and churchman, but more than that. They gave him their greatest praise because he was a scholar and particularly because he was a scientist and mathematician. In an age of ecclesiasts he receives more credit for his services to the cause of learning than for his services in the interests of the Church. But the modern judgment has been otherwise. With such men as Pegge[4], Perry, Robinson, and even Stevenson, it has been Grosseteste the ecclesiast and statesman that stands out most prominently rather than Grosseteste the scholar and scientist. The tendency has been to magnify him--though wrongly--as a forerunner of revolt against papal authority and of the rise of the Reformation, and to minimize, to very hurriedly pass over, or to neglect altogether, his career in the field of learning. In an age of scholarship it has been his work as a churchman that has attracted greatest notice, and his scholarly achievements have been too little recognized.

Why should there be this difference in estimation? Several reasons undoubtedly enter in. As far as his contemporaries are concerned, it may be that they, particularly Roger Bacon, overestimated his abilities as a scientist. Certainly it would be rather hard in the face of the limited knowledge we now possess to justify some of the Franciscan's most enthusiastic enconiums. And then too, it may be that in this thirteenth century the great ecclesiast and theologian was far more common than the great scholar, and hence even mediocre services and achievements in the field of science would attract more notice than far greater activity in the cause of religion.

As for the judgment of our modern biographers, it too can be explained. In the first place, many of Grosseteste's achievements as a scientist and mathematician have been superseded and thrown overboard as a result of more modern investigations. Naturally the best work of a medieval scientist was in many respects crude and imperfect, and modern scholars, in the light of the knowledge gained by present day methods and with present day appliances, are apt to deride the less accurate and more superficial conclusions reached by the medievalist. Also we have been prone to think of the twelfth and thirteenth centuries as almost wholly ecclesiastical centuries, centuries in which the interests of theology and the church were the predominant ones, as indeed they were. And hence it is the achievements along those lines on which our attention has

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[1] Samuel Pegge was an 18th century biographer of Grosseteste. His work is a collection of materials concerned with Grosseteste, rather than a formal biography. Much of it has been superseded by more modern works. It is interesting to note that the list of Grosseteste's works, as given by Pegge, occupies twenty-three closely printed quarto pages; but of course many of these works were falsely ascribed to the Bishop, as later scholarship has shown.

been focused, and other fields, naturally though not intentionally, have been neglected. Grosseteste the ecclesiast seems to fit in better with our idea of this period than Grosseteste the scientist and scholar.

Also, and this probably is the strongest reason of all, it is to be remembered that while Grosseteste's influence came down for many years through a few individuals, his work as a scientist, as a mathematician, or as a linguist was not immediately earried on by any large number of scholars;the particular interests with which we are here concerned and of whose development the twelfth and the thirteenth centuries seemed to give much promise, did not continue uninterruptedly to their fruition. In the thirteenth century the scientific spirit made great advance; in the fourteenth and succeeding centuries it was crowded out by other interests. The powerful humanistic movement and the great religious conflicts that for so long engrossed the attention of Europe,put the scholarly achievements of the middle ages in the background, and it is only the most recent scholarship that is beginning to bring them out again to their rightful place. As they are brought out, the work of Grosseteste as a churchman will not be forgotten, for it was important; but his services in the cause of learning, and especially in the cause of science and of languages will be more and more appreciated.

In attempting to form an estimate of Grosseteste's scholarship and particularly in seeking to determine when and how his intellectual training was received, we are frequently at a loss because we unfortunately know so very little of his early life. Details in this regard are almost wholly lacking. We are obliged to piece together little bits of information gleamed from the annalists and from his own writings, and then draw our conclusions as best we may, conclusions that in many cases possibly are erroneous. The date and place of his birth are even controversial, but it is probable that he was born in 1775 near Stradbroke[1] in Suffolk county,England. Of his family little is known, but various hints in the chronicles of the day indicate quite clearly that he was of humble origin[2], and probably his early days were those of any peasant boy.

The earliest date that can be definitely connected with his life is 1199 when Giraldus Cambrensis, the Welsh historian, writes concerning him to the Bishop of Hereford, speaks of him as a "Magister", refers to his knowledge of the arts and of literature, implies that he had a certain skill in law and in medicine, and pays tribute to his moral character and worth[3]. Obiviously, then, a considerable part of his schooling, if that word may be used, must have been re-

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[1] Annals of Matthew of Westminister, cited by Dr. Luard in his introduction to Grosseteste's epistles; page 31.

[2] Trivet's "Annals"; page 242.(Cited by Luard). Chronicon de Lanercost Ed. J. Stevenson. page 43. Matthew Paris,"Historia Anglorum".Vol.II,page 376.

[3] Giraldus Cambrensis "Opera". Vol. I, Ed. Brewer; page 249.

ceived before that date, though what had comprised it we can not say with certainty. Beyond a doubt he studied at Oxford, probably going there not later than 1192/93, and there are assertions[1], though not substantiated, that he received some preliminary education in parish schools at Lincoln or Suffolk. Whether or not he did, his mind must have been rich field for the planting of intellectual seed, or he could hardly have attained by 1199 to the proficiency of which Giraldus Cambrensis writes. At Oxford, then a flourishing university, though still a comparatively young one, he undoubtedly pursued the studies of the trivium and the quadrivium, and according to the Welsh Chronicler he must also have studied medicine and law. But whether or not he had thus early become interested in philosophy, theology, languages and physical science we can not say.

About 1199 he had apparently left Oxford and attached himself to the household of the Bishop of Hereford, possibly hoping that in time he might gain ecclesiastical preferment through this agency. This hope, however, if he did in reality harbor it, was not to be realized, as the Bishop died in December of that year, and so the young man was once more thrown upon his own resources. Again there is a doubt as to his career immediately following this change in his fortunes, but there is a possibility almost approaching a certainty that ~~now~~ he, as many other English scholars[2] of his time did, went to Paris to continue at the university there the studies he had begun at Oxford. As evidences of this period of study at Paris may be cited his intimacy with a number of French ecclesiasts and scholars;[3] the testimony of Bulaeus, the medieval historian of the University of Paris[4], whose statement however, can not be taken as conclusive, since he was over-much given to inaccuracies; Grosseteste's acquaintance with the theological course at Paris[5]; his system of chronology constructed upon the basis of the meridian of Paris;[6] and his thorough knowledge of the French language, though this too cannot be regarded as very strong evidence, considering that French was then known to many in England and was in fact the language commonly spoken at the English court. These bits of evidence taken singly are small and inconclusive, yet in their cumulative effect seem well nigh convincing.

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[1] Taylor: "Medieval Mind". Vol. II page 391
Perry: "Life and Times of Robert Grosseteste,Bishop of Lincoln", page 20.

[2] For example, John of Salisbury, Daniel de Morlai,Giraldus Cambrensis, Stephen Langton, Edmund Rich etc.

[3] Among these were William de Cerda, a prominent scholar of Paris, and William of Auvergne, Bishop of Paris and a teacher in the university, first in the faculty of Arts and later in the faculty of Theology.

[4] Bulaeus:: "History of the University of Paris";Vol.III,page 260.

[5] See Letter CXXIII of Grosseteste's epistles.

[6] This chronological reckoning is Grosseteste's "Kalendarium." See Chapter III page, 36

Taking for granted his attendance at Paris, it is probable that he was there largely for the purpose of a further study of theology, though he must have continued his work in other branches as well. The education of the day was largely for ecclesiastical purposes and Paris was the leading intellectual seat; so here Grosseteste found special advantages for the study of theology and read the Fathers and important theologians with great care. The "Sentences" of Peter Lombard[1] had by this time become the leading text for theological studies, and this work undoubtedly played no small part in his training; yet he never allowed himself to follow it slavishly and continually held that to the Scriptures themselves, rather than to any such text as this, one must look for final authority.

In spite of Grosseteste's study at Paris, his degree in divinity was not taken there, but at Oxford[2]; and hence we are led to believe that after his return from Paris, the date of which is uncertain, he once more enrolled himself at Oxford and remained a student there until he had completed the theological studies requisite for a degree. And from this time on until the date of his death,he had some connection with,or at least some strong interest in,the English university. It is possible, though by no means certain, that he went to Paris in 1209 or 1210, following a temporary dispersal of Oxford university due to a quarrel with King John over the maintenance of order at Oxford; but in 1214 this trouble was ended and the university quickly regained its place[3]. If Grosseteste did make this second visit to Paris, he probably was this time--as Bulaeus asserts[4]-- a teacher rather than a student; but the whole matter rests on such uncertain evidence that no great confidence can be placed in it.

The University of Oxford always maintained more independence than the majority of schools of that age[5], but yet to some extent its affairs were under the supervision of the Bishop of Lincoln in whose diocese it lay. To him was granted the right of appoint-

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[1] Peter Lombard(C1100-1160). His "Sentences" were an attempt to collect under the heads of the different theological questions that were prominent the quotations from the Scriptures and the Fathers that seemed applicable to these questions. This work had largely superseded as a text book in theology even the Scriptures themselves, a condition against which Bacon voices a bitter protest. (Opera Indita, Ed. Brewer; pages 328-329)

[2] Hearne: "Dunstable Annals", Vol. I page 299.

[3] For an account of this dispersal see Rashdall "Univerities of Europe in the Middle Ages"; Vol.II pages 348-349.

[4] Bulaeus: "History of the University of Paris"; Vol.III.page 709. (Cited by Stevenson).

[5] See Rashdall's "University of Europe in the Middle Ages";Vol. II, part II, pages 351-361.

ing the chief officer of the university, at first called the "Magister Scholarium", and later the "Chancellor". With this office Grosseteste was invested by Bishop Hugh de Welles, and indeed he was the first to bear the title of Chancellor. The very fact that this appointment was given to him is evidence of the reputation which he must have already enjoyed as a scholar and an administrator; and the fact that he either held the office itself or was closely connected with it till 1235, when he was chosen to succeed as Bishop of Lincoln the very man who had given him his university position, is a tribute to the power and efficacy of his work. His influence over the university was a remarkable one, and judging from the esteem in which his students held him, he was equally successful in guiding their studies and in winning his way to their hearts by the strength and beauty of his personal character.

His election to the see of Lincoln, then the largest bishopric in England, while it brought new honors, also imposed upon Grosseteste heavy ecclesiastical burdens. As a result, from this time on he was perhaps more of a churchman than a scholar and was less able to give himself to writing and study. Scholarship, even when it had a religious purpose behind it, had to be subordinated to his purely ecclesiastical duties, and during the years of his bishopric could receive only a comparatively small part of his attention. Of course he by no means ceased to be a scholar; otherwise his reputaation as an ecclesiast in his later years would have blotted out his earlier reputation as a student. He always was a scholar as far as he had the time to be. Indeed there was one period after his elevation to the Bishop's see, approximately from 1239 to 1244, which witnessed a renewed interest on his part in the field of learning, a period in which he accomplished valuable work for scholarship;[1] but his new duties kept him from doing as much as he probably would otherwise have done. His latter years were of necessity less prolific in their contribution to the cause of learning than were the years before 1235, to which a large part of his work must be ascribed. Also it is within this earlier period that he performed in another capacity the work that did much to make his reputation and to endear him to such of his contemporaries as Roger Bacon and Adam Marsh.

The work thus refered to is that which he performed in connection with the Franciscan school at Oxford, over which, in its earlier years, he exercised a dominating influence. Though the Dominicans had reached England several years earlier than the Franciscans[2], and though Grosseteste had welcomed them to Oxford and counted many of them among his close friends[3], still it was to the Friars Minor that

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[1] This period witnessed many of his translations; as of the "Testaments of the Twelve Patriarchs", the works of the pseudo Dionysius the Aeropagite, and others.

[2] The Dominicans in 1221; the Franciscans in 1224.

[3] Among these can be named John de Giles, who is believed to have been the first Englishman to join the Dominicans; Robert Bacon, probably an uncle of Roger Bacon, a scholar and theologian of high repute; and Richard Fishacre, best known as a commentator on Peter Lombard's "Sentences", and as a postillator of the Psalms.

his greatest interest and sympathy went out, probably because the helpful and practical ideals of the Franciscans made a stronger appeal to him than the more purely doctrinal program of the Dominicans.

It was in 1224 that the first Minorites reached Oxford where they were gladly welcomed by Grosseteste whose whole attitude toward them was far more kindly and sympathetic than that of many of the secular clergy of his diocese. Under their leader, Friar Agnellus of Pisa, a school was almost immediately established, a fact which gives one strong bit of evidence to controvert the oft-repeated assertion that the Franciscan order was consistently hostile to learning throughout the middle ages. It was this Friar Agnellus too, if Eccleston may be believed[1], who induced Grosseteste to become a lecturer to the Minorites gathered in the school thus established. Theology undoubtedly was his main subject, but we can well believe that his influence over the Franciscans turned the minds of some to other branches of learning as well.

It can safely be said that Grosseteste had in view two different things when he took upon himself this duty of lecturing to the Minorites,- a religious revival and a revival of learning. From the first it was seen that the Franciscans were going to be a mighty power, and that power would be increased in proportion as they sought to reach more classes of people. By aiding in the intellectual development of the friars, Grosseteste was making them more proficient in preaching and more able to reach those classes that would not be attracted merely by a religion of poverty and good works. Hence he was assisting in a great religious revival, a work which, as a thoroughly pious churchman, he put before every other. But on the other hand, his love of study and his desire for a revival of learning made him glad to undertake this work as a lecturer. He was far-sighted enough to know that if an order of such potentialities as the Franciscans showed could be won to the cause of education, a very great step in intellectual progress would have been taken; and he seized this opportunity to do his share in bringing about that educational awakening. It is useless to argue which reason was the more potent in his mind, though considering the inner character of the man, it is probable that his desire to foster religion was greater than his desire to foster learning. But however that may be, his efforts were amply justified, as is shown by his influence

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[1] Eccleston's "De Adventu Minorum" in Monumenta Franciscana Vol. 1. Ed. Brewer; page 37.

over men like Adam Marsh, Roger Bacon, Thomas Wallensis[1] and others of the same order. His work with the Franciscans was one of his most splendid achievements and his students in their school paid him every honor for it. It was naturally interrupted, as was his work with the university proper, when he became Bishop of Lincoln, but his interest in the Minorites never died out. Till the time of his death he was a trusted friend and adviser, and it was to the Franciscan school that his books and papers were bequeathed[2], while one of the most interesting contemporary tributes to the friars is from his pen in a letter written to Pope Gregory IX in which he most highly extols their merit and their excellencies[3].

Grosseteste's career as a bishop is comparatively well known and hence need not be considered here. We are concerned with his learning, and in later chapters certain phases of that learning will be discussed in some detail. But perhaps in the closing paragraphs of this chapter it would be fitting to touch upon a few of his intellectual activities that are not elsewhere to be taken up. Quotations from Bacon paying tribute to his powers as a scientist and mathematician have already been cited[4], but there were other fields also in which he had a high reputation. Rashdall says[5], "He was a French poet, an agriculturist, a lawyer, a physician, a preacher,-- and a scholastic philosopher". Archdeacon Perry in his biography of Grosseteste tells us[6], "He was the most learned man of his day--not only in all England, but in all Europe, and one of the most voluminous writers that England had produced. The greatest theologian, the greatest natural philosopher, and the greatest master of language of his time".

Stevenson, a more recent biographer, says[6] "In the domain of intellectual activity, Grosseteste must be regarded as the founder and inspirer of what may be termed the encyclopedic school of the thirteenth century, imparting to it a unity of purpose and loftiness of conception to which those who followed him hardly ever attained, although in particular branches and specific subjects they advanced

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[1] Thomas Wallensis, one of the minor members of the Oxford school and the fourth lecturer on/Theology to the Minorites, is said by Matthew Paris (Chronica Majora, IV, page 647) to have been a native of Wales. He had been appointed Archdeacon of Lincoln by Grosseteste in 1238, at which time he was lecturing in Paris; later(1247) he was appointed to the Bishopric of St. Davids in Wales. Bacon calls him one of "the wise men of old" who studied languages, and knew the value of philology (Opera Inedita, Ed. Brewer; pages 88 and 428), but we have no good evidence to substantiate that assertion.

[2] N. Trivet's Annals, page 243. Quoted by Lyte in his "History of the University of Oxford", page 57. See also Monumenta Franciscana, Vol. I; page 185 of Adam Marsh's Epistles.

[3] Letter 58 of Grosseteste's Epistles; pages 179-180

[4] Page 7

[5] Rashdall: "The Universities of Europe in the Middle Ages"; Vol. II, Part II page 522

[6] Perry: "The Life and Times of Robert Grosseteste, Bishop of Lincoln" page 7

[7] Stevenson: Robert Grosseteste's Bishop of Lincoln pp 23 and 31

beyond his teaching."

"The extraordinary range and profundity of his powers as exhibited in the works which are unquestionably his, entitle him to a place in the history of intellectual progress even more important than that usually assigned to him, while the evidences of his multifarious activity excite wonder and admiration."

Now, naturally the fact that three of these four writers are panegyrists of Grosseteste forces us to admit that their statements may be somewhat exaggerated, but yet even when allowances for exaggeration have been made, it remains certain that he was a many sided man of great abilities, and varied accomplishments, and that he deserves a far higher place in scholarship than has ordinarily been granted to him.

Special attention will be paid in later chapters to Grosseteste as a scientist and as a student of languages, but perhaps just a word should be inserted here in regard to his work:

I As a philosopher and metaphysician.

Owing to the fact that Grosseteste, like Bacon, was so much beyond his times in certain fields, as Science and Language, and represents a decidedly progressive force in medieval thought, there is a temptation to separate him from the body of Scholastics, as we ordinarily think of them. That, however, can not justly be done. He was a Scholastic; considering his age and his environment, he could not, even if he wished, wholly avoid Scholasticism. He was other things, before he was a logician or a metaphysical thinker, and yet he was also both of these. Just as Bacon does, he writes about "Universals", and treats of the contest between realism and nominalism, of the "intellectus agens" and the "intellectus potens", of the freedom of the will, and of the nature of God and other kindred subjects which are today ordinarily grouped under philosophy or psychology. In the metaphysical discussions he shows himself a realist rather than a nominalist, an Augustinian and a Platonist rather than an Aristotelian. But though he was an Augustinian, he was not one of the narrow school that affected to despise profane learning in general. He was a progressive who gladly met a new world of ideas and entered into it. Aristotle had a great influence over him along the lines of Natural Science, but in speculative thinking the use of the syllogism in reasoning is about the only thing that he takes over from that source. He naturally, however, was acquainted with the most of "the Philosopher's" works. He was largely instrumental in introducing the "New Aristotle" to Oxford, he lectured on the "Organon", the "Categories", the "de Interpretatione" knew the Logic, the Ethics, and the Metaphysics, and wrote commentaries on the "Sophistici Elenchi" the "Predicaments", the "Posterior Analytics" and the "Nichamachean Ethics".

II As a Mathematician.

It is well nigh impossible to separate some of his mathematical conceptions from his scientific ideas. His work as a mathematician overlaps his work as a scientist, and so will to some extent be treated later when the attempt is made to discuss his scientific

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1 Rashdall: "Universities of Europe in the Middle Ages"; Vol. II Part II. page 522

interests. It may merely be said here that the importance he gives to mathematical and numerical relations, which he holds control[1] all nature and underlie all being and matter[1], seems to justify the high tribute which Bacon pays to his mathematical work and interests. He wrote various treatises within the field of mathematics[2]; and a Geometry and Arithmetic have commonly been ascribed to him, though the latest scholarship is inclined to reject the authenticity of these[3].

III As a Theologian.

Until recent years Grosseteste has been better known for his theological writings than for those in any other field, probably because of our conception of the age in which he lived. He was a most prolific writer, and manuscripts have been preserved of between two and three hundred sermons, over sixty treatises, a summary of Augustine's "City of God", comments on the Gospels (Luke and John) on Paul and on the Psalms, and of a tract on the "Power and Duties of A Bishop", which especially shows his lofty conception of the episcopal office.-- Of particular interest also is a collection of "Dicta" (147 in number), which, as the name implies, are short pithy sayings of the Bishop on such themes as Faith, Grace, Prayer, Pride, Envy, etc., simple yet full of profound truths and of a decidedly modern tone; and a treatise "De Cessatione Legalium", showing Grosseteste's attitude toward the Jewish question in England[4].

By Grosseteste's study at the Universities of Oxford and Paris he undoubtedly had gained a deep knowledge of theological subjects, a knowledge that covered the most abstruse as well as the simplest questions. Among his treatises are abstruse discussions of such subjects as the "Nature of God", the "Nature of Angels", the "Nature of the Soul", but these are offset by the simpler topics of many of his sermons and his "Dicta".

It has been said of him,[5] "His was a positive rather than a scholastic system of theology", and the whole trend of his writings and of his lectures at Oxford was to emphasize the essentials of religion, piety and good works rather than form and creed. And yet in spite of that, he was a good deal of a conservative in theology, a firm adherent of the Medieval church and a steadfast believer in the authority of the Holy Fathers.

Probably it would be just to say that he held that all theological learning should be based upon the Scriptures, the Fathers, and Reason, in the order named. Certainly he would have put the Scriptures first, for he displayed very great reverence for them all

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[1] In his "De lineis, angulis, et figuris".

[2] His "Computus", "De lineis, angulis, et figuris".

[3] Stevenson and Felton accept these works as authentic, but Baur rejects them.

[4] See Chapter IV, pages 68 and 69

[5] Stevenson: "Robert Grosseteste's Bishop of Lincoln", page 17.

and was insistent that a study of them should rank above any other study. His work in Biblical Criticism and for Bible study stands out as one of the principal achievements in his career as a theologian; and one of the best expressions of his belief that a knowledge of Scripture must underlie all other theological learning is contained in his celebrated letter to the Regents of Theology[1] at Oxford, where he says that just as skillful builders in laying foundations make careful choice of such stones as are capable of supporting the structure above, the Master Regents in Divinity ought to take the Old and New Testaments as the only sure foundation of their teachings and make them the subject of all their morning lectures. Other words of his also breathe this same spirit of devotion to the Bible, and the fact that at some place or another in his writings he quotes from nearly every work of canonical scripture shows how well he himself must have followed the directions he recommended to these Oxford teachers.

Now, without touching upon some of the minor fields in which Grosseteste also interested himself, let us turn to two great fields in which he was a pioneer and where he did a work remarkable in its age; that is the fields of Natural Science and of Languages.

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[1] Letter CXXIII of Grosseteste's Epistles: Ed. Luard.

CHAPTER III

GROSSETESTE'S INTEREST IN SCIENCE.

Chapter III

The thirteenth century was decidedly a century of scientific tendencies and achievements though this fact has not been realized until comparatively recent years. Following a century in which scientific interest was hardly yet awakened and preceding one in which it was crowded out by other tendencies, it is not altogether surprising that the real character of the period has been largely overlooked by modern writers and that the ordinary histories of science have treated the thirteenth century as though it were a barren age, one to be lightly passed over in the rush to take up the later work of Francis Bacon and Decartes.

But in the course of the last few decades students have looked less superficially and more analytically into the intellectual life of this period; and as a result a very different judgment is being formed in regard to it, a judgment that furnishes the basis for the opening sentence of this chapter. Even now however the analysis is hardly more than begun. Some of the latest books on the history of science omit names that beyond a doubt were very important during the latter part of the twelfth and thirteenth centuries[1]; our knowledge on many points is very weak and imperfect; much must yet be done before this period is placed in its right perspective. But at the same time much has already been done and, the more one studies this particular age, the more one is convinced that it was chiefly characterized by a scientific tendency. The very fact that during this period there were so many attempts in "Compendiums" or "Summas" to classify, or analyze and arrange, or unify the different branches of knowledge is in itself an evidence of this scientific bent; while the study of such manuscripts as are being gradually brought to light substantiates in particular the general idea more easily gained.

De Wulf[2] ascribes the pronounced advance in learning during the thirteenth century to three main reasons. I The introduction of new learning--especially that of the Greeks and Arabs--into the West; II The rise of the universities; and III the work and influence of the mendicant orders. Of these three reasons, the first and the last had a very important bearing upon the development of scientific interests: the second though not so important had an incidental influence along the same lines. The introduction of the "New Aristotle" into Western Europe has already been spoken of and need not here be again discussed, but a brief word might well be said in regard to the other factors named.

The work of the medicant orders was responsible for some very new ideas as regards the determination of the field to be covered by religious activities. Both orders did much to promote the cause of learning, the Dominicans from the first being devoted to study and the Franciscans, if not as an entire order, at least through

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[1] For instance the 1908 edition(Berlin)of Darmstaedter's "Handbuch zur Geschichte der Naturwissenschaften und der Technik" omits the name of Grosseteste, though most of his important contemporaries are included.

[2] De Wulf: "Histoire de la Philosophie Medievale"(1912)page 290

many individual members doing more and more to develop the intellectual life as time passed by. Both orders established schools at various university centers and not only had their own lectures on theology, but sent many students to the courses given on other subjects in the university proper.

Theology, as a purely religious subject, naturally received at first their chief attention, but the idea grew that some knowledge of other subjects increased their abilities as theologians and preachers and made them able to reach some classes of people whom they could not influence without this education. Also it was not long before the Franciscans especially, owing to the peculiar aims of their order, were actively engaged in the study of medicine and of the physical sciences, which naturally would be complemental to that study. The purpose actuating most of them probably was utilitarian and did not go beyond a desire to better fit themselves for their work of caring for and ministering to the sick and needy; but even so, an increased interest in science as science was bound to result from their studies, and too we can safely say that there were some members[1] of this order who came to put their interests as students ahead of their duties as Franciscans and so did an important service to the cause of learning, particularly to the cause of science, if not to the cause of the church.

The rise of the medieval universities, important as it was, cannot be said to have done a very great deal toward the advance of science as early as the time of Grosseteste. The branches of the quadrivium including astronomy received somewhat more attention than they earlier had done; a few centers in Southern Italy and Sicily witnessed a very active scientific interest; Montpellier and Salerno were important as medical schools; Paris and Oxford knew the new Aristotle, but its study was as yet limited by church decrees and did not flourish as actively as it did after 1255. Such instruction as was given was based almost wholly on "authority" and very little upon experiment and observation, and hence it was necessarily cold and formal. And yet, in spite of that, the university influence can not be wholly overlooked. These centers were the seats of learning, the homes of scholars. Scientific ideas, if not openly taught, were nevertheless being born and developed; and the students traveling from one university to another took with them such new interests and notions as were slowly being revealed. If they did not play such a very great part in arousing scientific interests, at least these schools were important agencies in disseminating new knowledge when once it was brought to light.

Largely due, then, to these three agencies was the increased interest in scientific studies, and that it was no trivial interest

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[1] It can hardly be doubted that Roger Bacon is to be placed in such a category.

the works of such men as Grosseteste, Roger Bacon, Albertus Magnus[1] and many others show. Not only have we been prone to underestimate the importance of it, but until recently, the tendency has been to grossly underestimate the extent of it, an error probably in part due to the peculiar classification of the branches of medieval learning[2]. This interest did not cover one subject or two alone, but it covered many. Physics, chemistry (in a very simple form, and under the name of alchemy) astronomy and astrology with no clear dividing line between them, medicine and surgery, botany, biology, cosmology, cosmogony and other minor branches were delved into and invested with results that, if erroneous in many particulars, were still remarkable for the age in which they were accomplished; while a spirit of invention and improvement along practical lines led to the production of many appliances of very definite value and utility[3].

Undoubtedly the latter half of the thirteenth century especially after the unopposed dissemination of the new Aristotle, witnessed a more general scientific interest than did the earlier half in which Robert Grosseteste did his important work. But that the earlier half was not unfruitful Grosseteste's own achievements show, and to him the remainder of this chapter will be devoted. He cannot be taken as a type of the scientific student prior to 1250. He was clearly far above the average and more than a mere type; his achievements were exceptional, but for that reason he is of all the more

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[1] Albertus Magnus: Count of Bollstadt in Swabia, Philosopher, Churchman, Scientist; born C1193; died 1280.--His young manhood was spent largely in study and travel. In 1233 he joined the Dominican order at Padua and soon became famous for his great learning, as a tribute to which the title "Magnus" was attached to his name by his contemporaries. He studied and taught both in Germany and at Paris; he was the teacher of Thomas Aquinas.

He was a very prolific writer, twenty-one volumes being required for his published writings. Though an ecclesiast and metaphysician, he also had a great interest in natural science, having a considerable knowledge of Botany, Geography, Zoology, Astronomy, Medicine, Mineralogy and Alchemy. He was one of the early champions of the study of science through experiment, and the accounts he gives of his own observations show that he himself followed the lines he advocated. For a brief account of his work see Chapter II of Walsh's "Catholic Churchmen in Science" (Philadelphia 1909)

[2] The Aristotelian classification of the branches of learning still prevailed. There were two great divisions of knowledge,--the Practica and the Theoretica. Under the Practica were grouped Ethics, Economics, and Politics; and under the Theoretica, Physics or "Scientia Naturalis", Mathematics, and Theology or Metaphysics. All works in Natural Science, therefore, came under the Theoretica and were a division of Philosophy Hence to the modern scholar, who never thinks of grouping the sciences under philosophy, that term gives a very false idea of much of the learning of this age.

[3] Among these may be cited the double-pivoted compass, spectacles, improved paper, new uses for gun-powder, a clock very closely approximating the modern alarm clock etc. See J.J.Walsh's "The Thirteenth the Greatest of Centuries" Page 456.

interest to present day students of that period.

It would of course be foolish to claim that this man was a scientist above everything else. No such idea could for a moment be supported. Beyond a question his greatest desire was to use himself in the service of God and of the Church, and had he been forced to choose between his studies and investigations and his work as a pastor and bishop, we cannot doubt where his choice would have fallen; but still the scientific interest had a strong hold on him, and we are led to inquire from what sourse that interest was derived. What impetus awakened in him the zeal he so clearly showed for natural philosophy?

Mr. Lyte in his "History of the University of Oxford" seems to ascribe this interest to Grosseteste's work with the Franciscans at Oxford and so finds in them the source of his scientific impetus. To quote Mr. Lyte[1], "His (Grosseteste's) interest in Physical Science seems to date from his connection with the friars. The founder of the Franciscan order had, both by precept and example, enjoined on his followers the sacred duty of tending the sick, and they in consequence, applied themselves diligently to the study of practical medicine. Some of the Friars extended their researches into the wider field of Natural Philosophy, and it was doubtless with the encouragement of his Franciscan allies that Grosseteste made those experiments which among the vulgar obtained for him the character of a magician." This statement Lyte bases upon a paragraph in Brewer's introduction to the "Monumenta Franciscana" where tribute is paid to the Franciscans' interest in Physical Science and to experimental philosophy and much credit is rightly given to their achievements along those lines[2]. Among other things, Brewer says, "With the friars came the first systematic attention to medical studies and to Natural Philosophy in general" And again, "The first sustained attempts at experimental philosophy commenced with the friars and grew out of the actual necessities of their position". But having said this, he saves himself by admitting in effect that the emphasis should be put upon the words "systematic attention" and "sustained attempt" and that "it would be incorrect to overlook the experimental studies of other schoolmen". Most certainly there were other individual scholars of the same period whose scientific interests were as strong as those of the Franciscans without receiving any impetus from them. No where does Brewer say, as Lyte seems to infer, that Grosseteste drew his inspiration from the Franciscans, or that "his interest in Physical Science dates from his connection with them." His connection with them is undoubted; his interest in their studies is beyond question; but certainly his activity along lines of Physical Science antedated his connection with the friars, and it would be far more reasonable to say that he was one source of their scientific interest rather than that the impetus originated with them and was then imparted to him.

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[1] Lyte:- "History of the University of Oxford";page 30(London-1886)

[2] Chapter II, page 15

Reference has already been made[1] to the letter of Giraldus Cambrensis to the Bishop of Hereford in which there is an intimation that even that early[2] Grosseteste had some knowledge of and ability in medical science, which science is certainly an antechamber to other physical sciences. But leaving that out of consideration a better argument can be produced. It is certain that his connection with the friars could not have come about before 1225. It was in the very latest months of 1224 that the first small band of Franciscans reached Oxford[3], and it is hardly probable that their school originated or that Grosseteste had any active relations with them for some months to come. Accepting that date however, we find Grosseteste in his fiftieth year, his life two-thirds completed. Without then denying the possibility of such a thing, it certainly is not at all probable that it was not until after his fiftieth year that he felt his first impetus toward scientific study. Unfortunately we can not ascribe definite dates to Grosseteste's various scientific works, nor even determine upon a chronological sequence. It seems reasonable, however, to hold that most of them were written prior to 1232. Between 1232 and 1235 ill health kept Grosseteste from much work of any kind, and after 1235 his duties as Bishop of Lincoln took up the greater part of his time. Hence the period up to 1232 must have been the most prolific period as far as scholarly achievements are concerned.

Keeping in mind then these two dates, 1225 when he first came into active connection with the friars, and 1232 by which time the greater part of his scientific work was probably accomplished, we are asked to believe that in this short space of seven years,years by no means unoccupied by other interests, he received the inspiration that led him to the fields of natural science, developed that impulse to its full fruition, gained all the knowledge that made him so remarkable among his contemporaries, worked out his theories, and put them all down in his various treatises. Manifestly a very improbable thing.--Add to this argument the fact that Roger Bacon speaks of Grosseteste as one who had devoted from thirty to forty years in the study of mathematics and science[4], which would obviously take him back far before 1225, and it becomes quite certain that Mr. Lyte's hypothesis is not tenable and that Grosseteste's connection with the Franciscans can not be looked upon as the source of his scientific interests. It is far more probable, as his influence over certain Franciscans like Adam Marsh and Roger Bacon

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[1] Chapter II, page 11

[2] Probably 1199, when Grosseteste was twenty-four years old.

[3] This date accords with Eccleston(De Adventu Minorum in Monumenta Franciscana I,pg.5) and with the Lanercost Chronicle(pg 30). It is however disputed by Wadding (Annales Minorum,I pp.305,362)who places the date as 1219. 1224 however seems to have the best evidence to support it.See Little: "Grey Friars in Oxford",page 2 and note.

[4] Opera Inedita. His reference is cited by Stevenson(page 51) from Wood's Annals.Stevenson gives the reference as Opus Tertium, page 472; but this reference seems to be incorrect.

goes to show, that Grosseteste had that interest long before he came in touch with the Minorites and that he passed some of it on to them, finding in their minds good ground for the sowing of such seed.

Considering the range of his different activities, there can be no doubt that Grosseteste possessed an encyclopedic mind whose grasp was not limited to any one or any few subjects.- The nature of God[1] and of the soul[2], questions of husbandry[3], the elements of government[4], the movements of the heavenly bodies[5]; all are discussed by him with equal readiness and indicate that no subject was so great as to daunt him, no question was too trifling to merit his attention. All other branches of knowledge, to be sure, were with him subservient to theology to which he considered all secular learning as a mere vestibule[6], but still his mind was comprehensive enough to find an interest in well-nigh any field of intellectual endeavor. That very fact, of which his writings show such abundant evidence, would be reason enough for his scientific interests, but particular impulses as well undoubtedly played a part in developing them. It may be, as Giraldus Cambrensis suggests, that his early studies at Oxford had started a train of thoughts along scientific lines; it may be that during his visits to Paris he came in contact with some student orlecturer of scientific bent who aroused such an interest in him. It is certain that the introduction of the "New Aristotle" had an important effect upon him long before it became very generally studied. To Grosseteste himself is commonly given the credit of having introduced the"New Aristotle"to Oxford, and only a very cursory glance through his scientific works shows how widely he had read "the Philosopher" and how much he had been influenced by him. The work of the Sicilian school too had surely attracted his attention and aroused his interest, as there were undoubtedly relations between the Sicilian court and the English court of his time[7]; while in some of his works the influence of Arab scientists is very pronounced. At one time or another he directly quotes from or shows a knowledge of at least ten Arab Scientists[8], and it is very probable too that others as well were known to him though we have no direct evidence of it.

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[1] In "De Unica Forma Omnium" and "De Scientia Dei".

[2] In "De Anima".

[3] In"Reules Seynt Roberd".

[4] In the "De principatu regni et tyrannadis" to which Adam Marsh refers. See Letter XXV, pg 110 of Monumenta Franciscana Vol.I. This treatise, supposedly written for Simon de Montfort, is not known today, and it is probable that it was merely a dissertation embodied in a letter to the Earl, rather than a distinct composition.

[5] In "De Motu Super caelestium".

[6] This is the same idea that Roger Bacon sets forth in various parts of his works, notably in Part II of his "Opus Majus ", on"The Connection of Philosophy with Theology". See especially chapter XIV.

[7] The Sicilian court of Frederick II, the most brilliant court of its time, kept in touch with all the important continental centers and drew to it scholars from every side.

~~8 Appendix 1~~

All of these factors, then, combined to quicken his scientific interest; and it may well be that with his interest once aroused, his natural bent carried him far beyond the work of most of those who aided in giving him his first inspiration.

Perhaps the factor for which Grosseteste should receive greatest credit in connection with his work is the method which he used. The results that he achieved were in many cases erroneous and useless, and of course they have been steadily losing their importance ever since. But the method which he, to a certain extent at least, attempted to use has been steadily increasing in importance ever since; and it is no small thing to say of Grosseteste that he was one of the pioneers in introducing that method.

Most of Grosseteste's contemporaries, if they studied natural science at all, studied it by the"book method", by a slavish subserviency to reason and authority, Aristotle being the most commonly accepted authority, as he earlier had been in logic. Grosseteste however was too bold and too independent a student to be content with any slavish method. Bacon says of him[1] that he wholly disregarded all the books of Aristotle and their ways and that by his own experiments, supplemented by the work of other authors, he gained a knowledge of scientific subjects far greater than he ever could have gained by simply devoting himself to such faulty translations of Aristotle's works as were at his command.--Now obviously this statement can not be taken to mean that Grosseteste did not know Aristotle's scientific works. Most decidedly he did know them,nor did he altogether neglect them, as his numerous references to them very clearly show; but Bacon's assertion must be taken to mean that he saw the danger of relying upon Aristotle, and particularly upon faulty translations of Aristotle, as the supreme authority,and with that danger in mind he made himself independent enough to accept or reject "the Philosopher" as seemed best to him,--He experimented for himself, he cut out his own way, he exercised his own judgment,he made his own observations. Natural science by way of experiment and observation was hardly more than beginning to dawn in his day;Bacon makes much more of it after him, and to Bacon the credit of being a pioneer in such lines is generally given. But undoubtedly Grosseteste was a precursor of Bacon and probably largely influenced him. Not only does he refuse to be bound by the authority of Aristotle, but he very openly critizes the Stagirite in some places and in the "Hexaemeron"[2] he sarcastically complains about the "Moderni" who, instead of being bold enough to disregard or reject Aristotle when his teachings do not agree with Christian doctrines,twist his language and his meaning in an attempt to bring him into harmony with their own accepted tenets.--That he placed observation,experiment and his own conclusions above any other authority is clearly shown by the frequency with which he uses the expressions "hoc pated experimento", or sometimes "hoc patet experimento et ratione",or at times again"hoc

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[1] "Compendium Studii Philosophicae" in Brewer's edition of Opera Inedita; page 469.

[2] Quoted in Baur's Monograph,"Das philosophische Lebenswerk des Robert Grosseteste",page 77 and note.

est contra experimentum et rationem". The knowledge gained from the written page, the authority of others, were only acceptable to him in proportion as they could be supported and justified" ab experimento et ratione, "and for this reason he must be granted a worthy place among the pioneers[3] of the modern day scientific school.

It must not be said however that Grosseteste was a blind experimentalist, experimenting without any idea of what he was trying to prove; nor can it be said that he depended upon observation alone. Undoubtedly he gained many ideas from the writings of others, but it was his plan and his attempt to justify these ideas, if possible, by experiment; and, if experiment, instead of justifying them, seemed to prove them erroneous, then he was bold enough to through them over board, no matter where they had originated.- How far his observations went, how accurate or how erroneous his experiments were, is after all a small matter. Naturally, considering his lack of apparatus and the relatively limited knowledge on which he had to proceed, he did make a great many mistakes; but even had present day science overthrown every conclusion at which he ever arrived - a thing it has by no means done - still he would deserve no little credit for instituting the method which he used[1].

The diversity of subjects which Grosseteste took up in his scientific treatises is remarkable. Even admitting - which we must certainly do- that many works have been ascribed to him of which he was not the author[2], still those which the latest scholarship[3] definitely grants to him form a very creditable list and cover a wide range of subject matter. Some of these treatises are short, some of them are perhaps incomplete, some of them are of relatively little importance, some of them contain statements that we of today consider trifling, yet taken as a whole they show a wide knowledge, a progressive mind, a scientific instinct, and they form an important contribution to thirteenth century learning.

It seems almost essential, in speaking of his works to adopt some classification of them, and that used by Prof. Baur in his "Die Philosophischen Werke des Robert Grosseteste", (1912)[4] while differing slightly from the classification used in an earlier article from his pen[5], seems to answer all meeded purposes. Hence in its

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[1] It is probably these very methods that later gained for Grosseteste the reputation of a necromancer and magician, and connected his name with the legend of the brazen head. See Gower's poem, the "Confessio Amantis", Book IV.

[2] As in Pegge's twenty-three page list. Some works thus erroneously ascribed to Grosseteste will be referred to later.

[3] At present writing Dr. Ludwig Baur's work must be considered as representing the best and latest scholarship.

[4] See pages 60-95 of Baur's work here cited.

[5] Baur's earlier classification in a monograph of 1910 was as follows:
I Kosmology:- De Sphaera, Computus, and Kalendarium.
II Astrophysics:- De Generatione Stellarum, and De Cometis.
III Cosmogony- De Luce.
IV Meteorology:- De Impressione Aeris.
V Optics:- De lineis, angulis, et figuris, De Naura Locorum, De Iride et Speculo, and De Colore.
VI Physics:- De Calore Solis, De impressionibus elementarum, De Motu Supercaelestium, and De finitate motus et temporis.

general scheme it is adopted here, and Grosseteste's scientific works will be briefly spoken of under five main heads.

I Optics:- This is one of the subjects in which Grosseteste quite probably influenced Roger Bacon. As a matter of fact, his work in that field neither went as far nor was as important as that of his Franciscan pupil, but it was an earlier work and in a few points at least superior to Bacon's. Bacon in Part V of his "Opus Majus" devotes nearly one-fifth of the whole work to optics and perspective, and in the "Opus Tertium" also devotes a chapter[1] to the same subject. His work in the "Opus Majus" shows especially the influence of the Arab, Alhazen[2], and yet from the fact that (in the "Opus Tertium") he speaks of Grosseteste as one who knew perspective[3], we can feel sure that he was acquainted with Grosseteste's work in that field and was influenced by it. The subject clearly was not one much studied or understood among the Latins, for Bacon says of it, "On this science no lectures have as yet been given in Paris, nor anywhere else among the Latins, except twice at Oxford[4], hence Grosseteste's work becomes all the more remarkable; and indeed, considering his connection with the university of Oxford we are led to believe that he was the single lecturer of whom Bacon spoke.

Four treatises may be grouped under this main head. "de calore", "de iride et speculo", "de natura locorum", and "de lineis, angulis et figuris".

De Colore[5]:- This is one of the shortest of Grosseteste's works, far too short to be satisfactory or enlightening. It shows something of his knowledge of Aristotle and of the Arab commentator Averroes, and as far as it goes, is reasonably close to our modern conception of color.

He begins with the definition "Color est lux in corporata perspicuo", but distinguishes between two general classes of transparencies, those that are free from any mixture with earthy matter and those that are characterized by such a mixture. Also he makes a four fold distinction as to the kinds of light; for light may be either little or much, clear or dark. And on the basis of these distinctions we have the different colors.

Grosseteste makes black and white the two extremes or opposites, black being the absence and white the essence of color. Between these there are seven degrees ranging from each, so that in all there are sixteen colors; but of these sixteen there are an infinite number of

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[1] Chapter XI and parts of chapters XIX-XXVII

[2] Alhazen (c.1038) was among the most prolific of Arab writers. Optics, Mathematics, and Astronomy particularly were treated by him, and Bacon shows his influence, in various places.

[3] Opus Tertium in Brewer's edition of Opera Inedita, page 91.

[4] Ibid; page 37

~~5 Appendix II.~~

gradations, according to an increase or decrease of the intensity and purity of the light.

De Iride et Speculo[1]:- This is one of the works of Grosseteste to which Roger Bacon directly refers[2], but from which he does not seem to have gained as much as he might, when it comes to his own discussion of the same subject. Grosseteste clearly designates refraction as one of the phenomena of light causing the rainbow: Bacon[3] seems as clearly, though of course erroneously, to reject that cause. Hence in this regard at least, Grosseteste's thesis is more reliable and scientific than that of his pupil and sucessor.

The treatise first points out the different interests which perspectives and physics have in speculation about the rainbow; the one treating of the essence of it, and the other treating of the cause. Grosseteste then defines optics(or perspective) as "the science which is concerned with visual forms---and depending on the position of the light rays emitted". He divides the science into three parts according to the position of the thing seen. The first part, he says, is treated by the science known as the science "de Visu"(of sight) the second part by the science "de speculis" (of mirrors); but the third division, to which the discussion of the rainbow is subordinated, "has even to this day remained with us untouched and unknown, though Aristotle has treated it fully[4]". Under this part and to be explained by it are optical illusions, the varied breakings of rays when passing through different transparent mediums, the phenomenon of continuity of light rays, etc.

In reality only the latter part of the treatise is directly concerned with a discussion of the rainbow. After touching upon various reasons advanced as explanations of it and rejecting them as unreasonable, he gives his own explanation of the cause, saying, "Therefore it reasonably follows that the rainbow is caused by the breaking of the sun's rays in the rain of a cloud convex outside and concave within". The remainder of the treatise is devoted to a substantiation of this assertion and to several statements about and explanations of the color of the bow and the varying degrees of color in different bows.

De lineis, angulis et figuris, seu fractionibus et reflexionibus radium:- Largely an independent work as in it Grosseteste seems to refer only to Aristotle, Averroes(commentator on Aristotle), Boethius and Euclid[5].

The work might be called a treatise on the physics and dynamics of light rays. As the name shows, he treats of refraction and re-

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~~1 Appendix III~~

2 Opus Majus; Ed Bridges. Vol. I. page 108.

3 For Bacon's explanation of the rainbow see Opus Majus, Part III; Perogative I. (Translated from the Latin by Alice E. Bell; Masters thesis at University of California, 1913.) Shorter treatments are also found in the Opus Majus I, pp 43ff(Ed Bridges) and in the Opus Minus, page 317.

4 Aristotle's discussion of the rainbow is found in his Meteorology, Book III, Chapter 2-6. Edited by Barthelemy Saint-Hilaire; Paris, 1863.

5 Aristotle's Physics and Metaphysics. Averroes' commentary on the "De Anima, "Boethius' "Arithmetica", Euclid's "Elements of Geometry."

flection of rays and sets forth views that are in general accepted as correct; especially are his conclusions said to be correct in regard to the reflection of light from polished and rough bodies[1]. His views as to the proportionate effect of rays acting at different angles are also given.

This is one of the treatises in which his mathematical ideas are very closely interwoven with his scientific views, and in which he holds that natural philosophy is built upon a mathematical basis, largely on a geometrical basis. The greatest strength of physical forces,- as of light rays- is shown when they are acting on straight lines or at right angles, while the force is less effective if it must act at any other angle, that is if, for example, the light ray must act upon a concave or a convex body.

Among the figures considered, he pays special attention to the cone and the pyramid, which he seems to consider as of basic importance in geometric relations. The pyramid is particularly important as furnishing (according to his idea) a basis for the measurement of force. The qualitative difference of physical force depend upon the quantitative differences of strength and weakness on the basis of linear relations, angles and figures.

De Natura locorum:- One reason why this treatise is valuable is that, though comparatively brief, it shows the wide range of sources that Grosseteste used. He quotes or refers to Aristotle's Meteorology[2] and the pseudo - Aristotelian "De Plantis[3]", Euclid[4], Pliny[5], Solinus[6], Ptolemy[7], Marcianus Heracloeta[8], and the Arabs

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[1] See De Baur's introduction to Grosseteste's philosophical treatises, page 79. He cites N. Creutze in the Bibliotheca Mathematica, writing on the subject of the refraction and reflection of rays.

[2] Aristotle's Meteorology is referred to on page 66 of Baur's 1912 edition of Grosseteste's philosophical works.

[3] The pseudo- Aristotelian "de plantis" or the Aristotelian "de vegetalibus" on page 68.

[4] Euclid's "Catoprica" on page 70

[5] Pliny's "Natural History", Part IV, on page 68.

[6] Solinus "Collectanea Rerum Memorabilium" on page 68 (Gaius Julius Solinus, a Latin grammarian and compiler; dates uncertain, but he probably flourished during the first half of the third century A.D. He was famous as the author of a "Collectanea rerum memorabilium", containing a short description of the ancient world with remarks on questions of history, religion, social institutions and natural history. THe work was quite largely based on Pliny's "Natural History").

[7] Ptolemy's "de Dispositione Orbis" on page 66.

[8] Heracloeta (c.400 A.D.) was a Greek geographer born at Heraclea in Pontus. He was noted for three works, 1 the "Periplus of the Outer Sea" in two books, a description of the coasts of the East and West Oceans, largely based on Ptolemy; 2 the "Periplus of the Inner Sea" (the Mediterranean), an epitome of a similar work by one Menippus of Pergamum who lived in the time of Augustus and Tiberius; and 3 an epitome of the eleven books of a geographical work of Artemidorus of Ephesus who lived about 100 B.C.)

Albumazar[1], Avicenna[2], Averroes[3], Alpetragi and Messalahe[4], which fact is certainly a noteworthy commentary on the extent of his studies.

Baur in his shorter work[5] has spoken of this treatise as being something of an attempt at a physical geography, but yet it is not particularly important save as being supplemental to "de lineis angulis et figuris". The subject matter of both treatises is quite similar though "de natura locorum" contains applications of some of the rules set forth in "de lineis", applying such rules to questions of the different zones and their temperatures, the seasons, the temperature difference between mountains and valleys, the influence of the moon and its beams, the ebb and flow of the tides, the formation of clouds, double refraction of light rays, etc.

Bacon, obviously, knew this work also as is shown by chapters three to eight, Distinction four of Part IV of the "Opus Majus"[6]. The ideas expressed here are identical with those of Grosseteste and in some places almost the very language has been taken over. We could not desire a better example to illustrate the influence that Grosseteste had upon the Franciscan student.

II. Meteorology:- While there are portions of several treatises that might easily enough come under this head, still it seems that there is only one work which as a whole can be so classified. That is the treatise "De impressions aeris", or "de prognosticatione"; and it is unfortunate that it is the only one, because it seems to be one of the weakest and least valuable of Grosseteste's works.

Apparently the treatise went under several different names, as, in adition to the two designations given above, manuscripts of it have been found bearing the names, "De prognosticatione temporum", and "regulae ad prognosticandam aeris dispositionem". These last two titles, better than the more common ones, indicate the character of the subject matter, for it is merely an attempt to lay down a method of predicting the weather.

Incidentally the so called "dignities" of the planets are named and defined, the "signs" are named and other astronomical terms are explained; but the main intent is to prescribe rules for foretelling weather conditions. The only factors taken into consideration are the dispositions of the stars and positions of the planets, and hence the weakness of the work becomes at once apparent. Its contents are of practically no interest today, save as showing some of the crude beliefs held by even the greatest of medieval scholars.

The treatise however, weak as it is, is of interest from three extraneous reasons. First because of the great number of manuscript

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[1] Albumazar--Book unknown--on page 72 of Baur's edition.

[2] Avicenna's "De Animalibus" and "Ars Medicinae" on page 70

[3] Averroe's Commentary on the "De Caelo et Mundo" on page 69

[4] Alpetragi and Messalahe (Liber de Speculis) on page 70

[5] Baur: "Das philosophische Lebenswerk des Robert Grosseteste" (1910), page 71.

[6] Ed Bridges; pages 133-142.--On page 108 he seems to refer to the work when he speaks of Grosseteste's treatise "De locorum mundi investigatione".

of it which have been found[1] and because it was apparently used as an autheritative text by other writers on the same subject, facts which show in how great esteem it was held in the middle ages. Secondly, because it shows Grosseteste's knowledge of the Arab astronomer Haly[2], upon whose work it is almost wholly based; and thirdly because it is another of the works from which Roger Bacon very largely drew[3], and from that fact is again shown the indebtedness which the better known scholar owed to his predecessor. Bacon does not, to be sure, quote Grosseteste directly, nor does he name him at all in this connection; but there are in Bacon's "Opus Majus" passages so similar to parts of this treatise that the influence of Grosseteste can not be doubted.

III. Astronomy and Astro physics: It was probably in these fields that Grosseteste did his strongest scientific work. At least, if we are to believe Nicholas Trivet[4], it was his work in these subjects that was most popular in the thirteenth century and that did most to bring him fame as a scholar. While the treatises were not numerous, they were put forth in very many manuscripts, and quotations from them or references to them are very commonly found in other writings of the thirteenth and fourteenth centuries; nor is his fame unjustified by the subject matter discussed, the conclusions reached and the results achieved in these fields.

In the case of some of his treatises here, it may be that they were particularly strong because he had the aid of good sources. Astronomy was a favorite subject with the Arabs, and Grosseteste undoubtedly had the benefit, in translations, of many of their treatises as well as of works of Aristotle. - And yet it would not be fair to him to give this as an only reason. - Much that he wrote was surely the result of his independent studies and he must be given the credit for it.

De generatione stellarum:- Aside from its subject matter this treatise is of special interest as showing how widely Grosseteste used Aristotle. No less than six works of "the Philosopher" are quoted from directly or are referred to as authority[5], which indicates that in spite of his independent spirit and his refusal to be bound by "Authority", he was still very largely influenced by his Aristotelian studies. Also, leaving content out of account, this work shows most clearly the influence of Aristotle's Logic upon Medieval writing. It is a continuous piece of syllogistic reasoning; one syllogism follows another until the final conclusion is reached.[6] More than any other of Grosseteste's scientific works

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[1] Baur made a comparison of six manuscripts and refers to others

[2] Haly's "Meteorology" is especially referred to.

[3] Opus Majus IV; Ed Bridges. Pages 250 and following; particularly 259-261.

[4] Trivet is cited by Stevenson on page 46, by Perry on page 37, and by Baur in his introduction to Grosseteste's philosophical treatises, page 62.

[5] De Generatione et corruptione, De generatione animalium, the Categories, De Sensu et sensato, De Anima, and the De Caelo et Mundo.

~~6 See appendix IV.~~

it shows the effect of the introduction of Aristotelian Logic to Western Europe.

The subject matter of the treatise is concerned with the relation of the stars to their spheres, with the nature of stars and of their matter, with the question whether they are simple or complex, to which question Grosseteste answers that they are complex, and with their elemental substances. Stars and their spheres, he holds, are not of the same nature because they are not of the same working, and things of the same nature are of the same working; neither are they of the same creation, because they are not of the same nature.

That the stars are not simple bodies is clear to him because "according to Aristotle and other philosophers", there are only five simple bodies, "four elements and that splendid body which is called the fifth essence." However, there are seven planets, each in its nature differing specifically from the others. Hence, if the planets are not simple,- and they can not be if there are only five simple bodies while there are seven planets differing elementally,- the many stars obviously can not be simple. Also they are mixed bodies, because they are colored, and, according to Aristotle, everything colored is mixed.

The work is worthy of note as an attempted treatise of Astrophysics, and some of its statements in regard to the constitution, color, and general appearance of the stars are of interest. But as an attempt to make clear the particular question of the "generation of stars" it does not seem to reach very far.

De Cometis:- This is one of Grosseteste's works to which Roger Bacon directly refers;[1] so there can be no doubt as to its authenticity. There is doubt, however, as to the exact form in which it came from the author's pen. At least three different manuscript forms are extant, though in all three the body of the treatise is the same; the differences lie in the preface and the conclusions. As far as the general subject matter is concerned, it is a minor consideration which of the three versions is the authoritative one, and no attempt will be made here to discuss the question. Suffice to say that Professor Baur, who has undoubtedly studied the manuscripts more carefully than any other scholar, has decided that the one known as the Berlin manuscript is probably the correct one;[2] at least its parts fit together best as a whole and make the most comprehensive treatise. That manuscript is therefore the one he publishes, ~~and its translation is the translation appended here[3]~~ .

The treatise discusses the nature of comets and of their tails. Giving reasons in each case, it rejects various theories, as, for instance, that the appearance of the comet's tail is merely the effect of the reflection of light rays falling near the comet's

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[1] Opus Majus; Ed Bridges. Vol I, page 108.

[2] See Baur's introduction to Grosseteste's philosophical works; pages 70-71

~~[3] Appendix V.~~

head on small stars which act as mirrors; that the tailed effect is the result of the coming together of many light rays so that fire is generated; that a comet is merely "an aggregation of many neighboring stars arranged according to the sign in which the comet appears and coming together at the hour of its appearance"; or that a comet is a star, heretofore unseen, coming at last within the range of vision.-

Grosseteste's contention is that a comet is "a fire of sublime characteristics, separated from the earthly nature and like to the heavenly nature"; it is a "created fire", its creative cause being a star, and since every star is like in nature to one of the seven planets, therefore every comet is like in nature to one of them. Its motive cause is the movement of the "first heaven". The tail is merely a belt of never dying fire created with the comet and borne along by it.

Each comet has a greater likeness to some particular star, the star whose virtue created it, and each comet is attracted by its creative star just as iron is attracted by the magnet.

The weaker and non-essential, if not uninteresting, part of the treatise deals with comets as portents and brings out the medieval idea that their appearance, particularly if in conjunction with certain planets, may signify either disaster or benefit according to position and aspect.

De Sphaera:- This is one of the longer scientific works definitely ascribed to Grosseteste, and forms one of his most important productions. It was very well known and popular throughout his century and the following one, and it is this work, together with the "De Arte Computi", that Trivet credits with gaining him his greatest scientific fame among his contemporaries[1]. Particularly valuable because of its importance in the development of Astronomical reckonings, it was generally accepted and held in high repute. Numerous manuscripts of it are extant, though there are slight variations in content and several in title. It is variously designated as "Sphaerae Compendium", "Sphaera Caelestis", "De figura Mundanae", or merely "De Sphaera".

Its contents, partly scientific and partly mathematical, cover a wide range of subjects which can merely be indicated in general here without going into detail. To a certain extent, the treatise shows the influence of Aristotle, Thebit, and Ptolemy, but in the main Grosseteste seems to be writing as an independent authority;which makes the work all the more interesting and valuable.

His ideas are set forth concerning the sphere, which he calls the "machina mundanae", the appearance of the heavens, the rising and setting of the constellations,whose signs he names, the Zodiac, the equality or inequality of days and nights, the moon's orbit, ecliptic and phases, together with the source of its light, the seven climes, or habitable belts of the earth including all save the extreme belt which he calls"land uninhabitable because of cold"

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[1] See Note 4 on page 32.

A "clime" he aptly defines as "a sufficient portion of the earth so that within its bounds the clock varies perceptibly".

He presents his proofs - some of them still used today-for the spherical shape of the earth and for its rotation, while as a proof for the spherical shape of the sky he merely refers to its appearance. He defines the axis and the poles, treats of the circles, the horizon, the zones, the causes of the seasons, the movements of the stars etc. Most of the terms which he uses are the familiar terms of modern Physical Geography, or Astronomy, but a few are of less frequent or very uncommon usage. For instance he designates as the "Colures" the two great circles of the celestial sphere which passing through the poles cut the equinoctial and solsticial circles respectively; he speaks of the "Aux" of a planet particularly of the sun,- that position when the planet is furtherest from the earth; and of the "fifth essence", a term well enough understood in ancient and medieval astronomy, but quite uncommon today. He defines it as "that whole body spherical within and without, having nothing beyond itself and containing in itself all bodies of a like shape and position,--the one body of this universe, which philosophers call the fifth essence, or ether, or the body of the sky".

Many other things, also are discussed (~~for which see treatise appended~~)[1], but these already mentioned are evidence enough of the comprehensive nature of the work and of its value, and show clearly that Grosseteste's astronomical knowledge was by no means slight. Some of the ideas set forth have, of course, been superseded, but so many of them are still accepted that we are forced to put away the thought that the medieval science of astronomy was only a very superficial thing.

It is interesting, if not important, to note[2] that some parts of Grosseteste's treatise appear almost verbatim in the "De Sphaera" of John Holywood[3], which work largely superceded Grosseteste's in the latter years of the thirteenth century. The two men undoubtedly wrote very close together, and yet it is probable that Grosseteste's work appeared first by a few years and that Holywood had the advantage of using it.

De Computo or de arte Computandi. (Computus or ars computi)- This work, together with the Kalendarium and supplementing the "De

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~~[1] Appendix VI~~

[2] See introduction to Baur's edition of Grosseteste's works; pg 64

[3] John Holywood, or John of Sacro Bosco (d.1244 or 1256) was a student at Oxford and later a teacher of mathematics at Paris. He was particularly noted for his astronomical studies, and his most famous work, the "Tractatus de Sphaera" was a compendium of Astronomy largely based on Ptolemy. He also wrote a treatise on the correction of the calendar, "De anni ratione" or "De computo ecclesiastico". See Strunz: "Geschichte der Naturwissenschaften im Mittelalter"; page 101.

Sphaera", had a very great importance in paving the way for the later sixteenth century reform of the calendar.- Ordinarily Roger Bacon receives too much credit for his part in this movement[1], while Grosseteste is almost entirely overlooked. Neither man of course deserves all credit, but most clearly Grosseteste's efforts antedated those of Bacon and had a considerable influence upon them.

Neither the "Computus" or the "Kalendarium" has yet been published, though both are extant in several manuscripts in European libraries. Baur however, publishes a table of contents for the "Computus[2]" while various articles on the calendar[3] give us information as to the subject matter and treatment in both works. The "Kalendarium" itself was probably short and in tabular form; it is however of much interest to know that it was constructed on the basis of the meridian of Paris, and this fact, showing Grosseteste's knowledge of the French capital, may be given as a bit of circumstantial evidence to justify us in ascribing to him a period of residence there, probably as a student.

The errors of the Julian calendar are too well known to require discussion here. Suffice it to say that by Grosseteste's day the lunar error amounted to three days, while the error in the solar reckoning was approximately eight days. As a result, there was much confusion in the determining of feast days and in the foretelling of the dates of the equinoxes, solstices, etc. And yet the system of time reckoning had upon it the seal of approval of the Nicene Council, and therefore most churchmen were hesitant to attack it.

Naturally the errors had not gone unnoticed; many had commented upon them before[4] and attempted explanations, but Grosseteste stands in the forefront of the churchmen- if he was not the first - who definitely attempted to evolve a scheme of calendar reform.

The table of contents of Grosseteste's "Computus" (~~See appendix~~)[5] is of course very imperfect in regard to details, and a study of the document itself would be necessary in order to understand satisfactorily the author's views and to gain any idea as to the accuracy of his reasoning and his calculations. However, from even such a knowledge as we have, we know the treatise was a comprehensive one, and its undoubted influence later is a tribute to its value.

Grosseteste boldly blames the inaccuracies in the calendar to a faulty knowledge of Astronomy on the part of its founders and of the Nicene Fathers, while the fact that these inaccuracies had so long continued he lays to the part of the Church in that it, on the one hand, had too little encouraged Astronomy, and on the other had been too unwilling to break away from the old customs and traditions.

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[1] See Walsh: "The Popes and Science" (New York, 1908); page 323, and Bridges' edition of "Opus Majus"; Vol. I, page 285 and note.

[2] Baur's Introduction to Grosseteste's philosophical works; pp67-

[3] Kaltenbrunner's monograph (See bibliography, pages) is probably the best source of information on this subject, though Baur also discusses Grosseteste's work for calendar reform; pages 65-68.

[4] Among those who had so commented may be noted Gregory of Tours, Bede, Alcuin, one Master Conrad (c 1200), and others; but these had offered no definite plans for correcting the errors.

~~5 Appendix VI~~I

The years, both lunar and solar, must be based on exact astronomical observations and calculations, and by resorting to such means, he was sure that all existing errors could be corrected and future errors could be avoided. With regard to the solar reckoning, he followed the computation of Ptolemy and said that every three-hundred years one day should be dropped in order to eliminate error; but for correcting the lunar error he turned to the Arabs. The Arab thirty-year lunar cycle had long been known and was almost absolutely correct as far as the lunar year is concerned[1]. However, Christian chronologers seemed loath to take over the astronomical tables of the pagan Arabs, and Grosseteste stands out as the first important churchman who directly advocated as the one sure means of correcting the lunar error and of accurately determining the dates of the new moons an adoption of the years and months of these infidel scientists.

As a churchman too, he was much interested in the accurate determination of Easter and other feast dates and put much emphasis on the fact that while the earliest bound of the paschal week could not rightly come before March 14th, still in his own time the vernal equinox was set upon that date, according to which computation the paschal period might begin nearly a week earlier. Also he pointed out that a maximum error of five weeks was possible in the determination of the Easter date according to the reckoning then in vogue. This is an argument that Bacon used with much effect later on[2], though we are inclined to doubt whether his ecclesiastical interest was as sincere as Grosseteste's.

The content of this "Computus", then, is undoubtedly valuable, but the treatise, aside from its subject matter is of great interest as showing Grosseteste's knowledge of and confidence in Arab scources and his willingness to champion the views obtained from such sources. Beyond a doubt, when as influential a churchman as was Grosseteste was willing to take the ideas of the infidel Moslems and apply them to reforms very closely connected with the Christian church, a considerable step was taken toward the working out of those ideas and the bringing to pass of those reforms. And for that Grosseteste must receive full credit.

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[1] Arab years were purely lunar, each year consisting of twelve lunar months. They were arranged in cycles of thirty, nineteen of which were common years of three hundred and fifty-four days and the other eleven intercalary, having an additional day to the last month. The mean length, therefore, can be reckoned at 354 11/30 days, or 354 days 8 hours 48 minutes, or 29 days 12 hours 48 minutes for each month or lunation. This differs from the astronomical mean lunation as we now figure it, by only 2.8 seconds, which error will amount to one day in about 2400 years. Hence it is seen that this cycle was very accurate for the lunar year.

[2] In "Opus Majus", Part IV-"Correctio Calendarii". Vol. I pg. 274 of Bridges edition. Doubtless Bacon thought that this argument would appeal more strongly to Pope Clement IV than any other argument that he could put forward.

The treatise also is of interest because of its influence on later writers connected with the same calendar reform. Campanus[1] probably was influenced by it; Bacon undoubtedly knew it and used it, though he makes no direct reference to Grosseteste when he is setting forth his views on the subject[2]; one Master Gordianus, a computist writing somewhat earlier than Bacon, refers explicitly to Grosseteste and seems to adopt some of his ideas; John of Muris[3] and John of Thermis[4], both writing in the fourteenth century, seem to have been influenced by both Grosseteste and Bacon, though they give no credit to their sources; and in the fifteenth century both Piere d'Ailly[5] and Zoestius[6] show a knowledge of Lincolniensis and his Franciscan pupil. Piere d'Ailly especially brings out that influence, referring frequently to Grosseteste and quoting Bacon directly, so that there can be no doubt that the thirteenth century impetus was still alive. From these last men it was only a step to the final calendar correction under Pope Gregory in the sixteenth century, so surely we are justified in giving Grosseteste no little credit for the part he played in this reform and for the scientific ideas that inspired him.

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[1] Johannes Campanus was chaplain of Urban IV and a contemporary of Grosseteste and Bacon. He wrote a "Computus Major" on chronology and dealt at some length with the errors of the Julian calendar. This work was probably written after Grosseteste's "Computus" but before Bacon's work on the same subject. In many respects the ideas he sets forth are the same as those embodied in Grosseteste's treatise.

[2] In "Opus Majus", Edition Bridges, Vol. I, pp 269-285 and in "Opus Tertium", Ed. Brewer, chapter 68, pp 274-275.

[3] John of Muris, probably an Englishman by birth, lived in Paris about the middle of the fourteenth century and taught mathematics at the Sorbonne. He was, also, especially interested in music, on which he wrote several books. In 1345 he wrote a short treatise on calendar reform.

[4] John of Thermis, a monk, in 1354 wrote a treatis on the need of a reformed chronology. It was addressed to Pope Innocent VI, and its strongest argument was for a better determination of the Easter dates.

[5] Piere d'Ailly (Petrus de Alliaco): Born in Picardy 1350; died in 1425. In 1401 he became Cardinal of Cambray. He was the author of many astronomical treatises and seemed particularly desirous of seting forth the advantages that might come to Theology from a good knowledge of Astronomy. Several of his treatises touch upon the need of calendar reform, but the one wholly concerned with that subject is the "Exhortatio super correctionem calendarii", a thesis presented in 1417 to the ecclesiastical council of Constance.

[6] Zoestius: But little is known of this man. He was probably a monk of the Cistercian order in Westphalia. In 1432 he wrote a treatise on calendar reform in which he shows an acquaintance with the works of many preceding chronologists, including Sacro Bosco, Grosseteste, Bacon, John Muris, and Piere d'Ailly.

IV. Cosmology:- The treatises under this head, if they are not among the strongest of Grosseteste's works nor particularly important for their scientific reliability, are still noteworthy because of the striking views presented. They certainly reveal their author as an independent thinker of considerable power.

De luce seu de inchoatione formarum:-The theory of light here set forth is one of the most interesting presentations to be found any where in Grosseteste's works. Baur calls it "A neo-platonic, cosmological theory of light as comprehensive as any that was ever developed".[1] It is practically the same conception as that found in the "Hexaemeron", though the latter work also treats of several other subjects not considered in the "de luce".

Light, resting upon a mathematical basis, is "the first form of the material world", indissolubly bound up with matter; Grosseteste's theory of it lies at the very center of his natural philosophy.

Everything was created from light, which multiplies and expands in all directions, just as a point of light can with a simple movement increase in a second's time to a whole circle. As it spreads out, it scatters matter equally in all directions through space, and, in the genesis of the Cosmos, this resulted in giving to the universe a spherical form. But in this diffusion of matter, it naturally happened that that at the outer periphery of the spherical form was most attenuated because it was spread over the greatest space; while that at the center was much denser. The matter was so much attenuated at the outer extreme that no further change could take place in it. This then, is the Firmament, a body simple in the highest degree.

Inside this firmament, or first sphere, and in a similar manner, was formed the second sphere, complete and stable in its own way; and thus the process of building up the universe continued, sphere after sphere being created until we have the four elements from which all other things come.

Light is also the principle of motion, The lower things are, the less they are of the nature of light and the less they respond to motion; the higher they are, the more are they of the nature of light and the more responsive to motion. - It is likewise the means by which all influences from the heavenly bodies reach the earth; the source of the color and beauty of all visible things; and the medium of relations between soul and body, in which last characterization Grosseteste is clearly bordering on that peculiar neo-platonic mysticism that marked so many medieval scientists.

Quod homo sit minor mundus:-Several manuscripts bearing this title are extant, but they are so short that it is difficult to believe an entire treatise is preserved in them. More probably the few lines given are a mere excerpt from some longer work.

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[1] Baur's Monograph "Das philosophische Lebenswerk des Robert Grosseteste", page 74.

Its contents, so peculiar as hardly to merit a scientific classification, are here given in translation:

"Almighty God of his own will made man in his own image. The body of man is composed of flesh and bone and is divided into four elements. For there is in it something corresponding to fire, something corresponding to air, something corresponding to water, and something corresponding to earth. The earthly nature is in the flesh; the element corresponding to water is in the blood; that corresponding to air in the breath; and the element corresponding to fire is in the vital warmth.- Then indeed a fourfold division of the human body will show the four kinds of elements. For the head corresponds to the sky; in which there are two eyes, just like the light of the sun and moon. THe breast is comparable to the air because, just as the blowingof breath comes out of it, so from the air comes the breath of the winds. The belly moreover is like to the sea on account of its collection of all the fluids, a gathering of waters, as it were. Finally the feet correspond to the earth, for these lowest of the bodily members are parched like the earth or dry like the earth."

V.Physics:- Not only was Grosseteste, as an independent writer, the author of several treatises dealing with subjects under this head, but to him also may undoubtedly be ascribed a commentary on the Physics of Aristotle. He has generally been considered the author of a "Summa" on the eight books of Aristotle's Physics,but the latest study of the manuscripts has seemed to justify a denial of the authenticity of this production[1]. He certainly did, however, write a commentary of a somewhat less comprehensive nature, a work concerned of course with all of Physics, but one which turns almost everything in it to the great central question of the Eternity of World, Time and Motion. This commentary has not as yet been published, but its contents are probably more valuable for the setting forth and elucidation of Aristotle's teachings than as an exposition of Grosseteste's own ideas.

Other treatises too, in part at least dealing with physical subjects, were ascribed to him, but later have had their authenticity denied or seriously questioned. Without doubt however he was the author of at least six treatises that can be classed under the head of Physics, though they at times branch off into other fields.

De Calore Solis:- This treatise was in all probability known by Roger Bacon[2] and, together with the work "de impressionibus elementarum" influenced[3] him in the setting forth of an atomic theory of heat much like the modern conception. Bacon has generally been

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[1] Stevenson,Felton,Perry,Luard and others ascribe this commentary to Grosseteste,but Baur denies its authenticity.For a discussion of his reasons see his introduction to Grosseteste's philosophical treatises, pages 19-24.

[2] Opus Majus, Ed. Bridges; Vol I, page 108

[3] This influence is apparently shown in the Opus Majus,Part IV, Chapter 15; Ed. Bridges pages 167 ff.

credited with having first proclaimed that theory, but there can be no doubt that Grosseteste antedated him in it.

In the "De Calore solis" he clearly bases the generation of heat upon an atomic hypothesis, the scattering of matter atoms by some violent motion; the more violent the motion, the more rapid the scattering of the atoms and hence the greater amount of heat generated.

Also he sees a cause of heat in the coming together of the sun's rays to a point, the more rays meeting at a point the greater the heat. Hence the varying temperatures of the different seasons; as for instance, when the sun is directly over the equatorial belt in summer, the more of its rays come to a point in that belt, and its temperature is heightened. A similar reasoning accounts for the other seasons; and also from this cause he brings one reason for the differing temperatures of mountains and valleys.- The lack of heat in the fifth essence he explains by the extreme attenuation of matter there, so that there is little chance for the condensation or reflection of the sun's rays.

De impressionibus elementarùm:- The first half of this is little more than a repetition or continuation of the ideas set forth in "de Calore Solis", though perhaps the importance, as heat factors, of the condensation and reflection of the sun's rays is somewhat more strongly brought out in the second treatise.

In the second half, basing his ideas largely upon those of the first part, Grosseteste discusses the formation of bubbles in water, the formation of vapors,mist, clouds, dew, rain and hail; and many of his explanations are those still adhered to by physical science.

De differentiis localibus:- Partly mathematical and partly scientific.- This treatise contains a discussion of the three space dimensions with the six corresponding directions- up and down,backward and forward, right and left-, and their application to the appearance of the heavens and their importance for astronomical observations. In this discussion there are several references to and comments upon Aristotle's "De Caelo et Mundo",Book II, and hence the theory has been advanceed[1] that possibly the treatise was only one part of a commentary upon that work, the rest of which is lost.

Further Grosseteste treats of the problem whether there is possible an absolute determination of place or only a relative one, apparently holding to the latter view; likewise he discusses the question of how beings on the individual space bodies, as earth, spheres etc., master the different space dimensions, and he brings out the difficulty in locating place which confronts those who have the poles for their zenith, because with them there is no rising and no setting of the sun and hence no right and no left.

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[1] In Baur's introduction to the philosophical works of Grosseteste; page 88, note I.

De motu corporali:- This treatise, together with the two following, is very largely concerned with the problem of movement, which seems to have been of special interest to Grosseteste. All three works show a very considerable knowledge of Aristotle, particularly of his Physics, and they seem to be an attempt to carry on the "Philosopher's "ideas.

The "De Motu Corporali" is brief and presents little that is wholly new in content. Much of it is very similar to the views expressed in the "de luce" and the "Hexaemeron". Light is again considered as the first corporealform; but the principal thesis presented by the treatise is the proposition that light is, in all bodies, the first motive force. Certain other questions are also raised that are more fully treated in "de motu super caelestium".

De motu super caelestium :- This is closely allied in content with the preceding treatise and carries further the question as to what is the motive force of the universe. The idea of a divinity is introduced in that connection, and the first mover is defined as "one immovable perpetual power, separated from matter."

Grosseteste sets forth the propositions that all potency in matter is finite and that no infinite activity can come from a finite potency. These theses are in opposition to the ideas of the infinity and indestructibility of the Heavens as set forth by Aristotle[1], and this lack of harmony in their views Grosseteste tries to explain and offset.

Only to a very slight extent does the treatise really discuss the movements of the heavenly bodies, and the larger part of the work is more metaphysical than scientific in nature.

De finitate motus et temporis:- This is practically the same as some of the concluding paragraphs in Grosseteste's commentary on the Physics, and it may be that he himself never set it forth as a separate treatise. It is however, undoubtedly authentic as a work of Grosseteste, whether or not he wrote it in its present form. It also bears many similarities to the "Hexaemeron".

The title of the treatise gives clew enough to its contents. It is almost wholly an effort to set forth the different proofs which Aristotle presents[2] for the eternity of motion and time, and to show that these proofs are untenable and erroneous.- The treatise is one of those in which Grosseteste stands out as an independent thinker and one who refused to be bound or blinded by the generally accepted authority of Aristotle. For that reason it is a valuable commentary on its author, regardless of the scientific importance- or lack of importance,- of the views set forth.

These then are the authenticated works of Grosseteste on scientific subjects. Others have been ascribed to him, some of which are now rejected, some of which are looked upon with suspicion and doubt. Among those definitely rejected are a "Theoria Planetarum" probably the work of Gerard of Sabbionetta[3], a "Difficilia

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[1] Aristotle's "De Caelo et Mundo" I.

[2] Aristotle's Physics VIII

[3] Gerard of Sabbionetta (C 1255),also called Gerard Cremonensis, but to be distinguished from Gerard of Cremona who lived C 1114-118?. In addition to the "Theoria Planetarum" he probably wrote versions and comments upon Avicenna's "Canon of Medicine" and other Arab treatises.

Naturalis Scientiae[1]", a work on necromancy, and one on the philosophers stone; among those which he may have written but whose authenticity is doubted are a "De natura luminis et diaphani", a "Quod motus sit in forma prima", a treatise on the means for measuring heights and depths, and an Astrology,- These works however, need not be discussed here, because of their relative unimportance and the uncertainity connected with them.

There are two treatises, nevertheless, of which perhaps a word might be said in spite of the fact that in all probability Grosseteste was not their author. These two, a "Compendium Scientiarum" and a "Summa Philosophiae" have until very recent years been universally ascribed to Grosseteste and considered asthe most important of his writings. They are much longer than any of the other treatises discussed here, and, as their titles indicate, are not scientific only in their nature, but make an attempt to cover pretty nearly the whole range of knowledge as it was then possessed.

The "Compendium Scientiarum", on which Stevenson lays particular emphasis and on the strength of which he calls Grosseteste" one of the great encyclopedic thinkers of the world"[2], was composed of treatises on the different branches of knowledge and covered the following subjects: The Divisions of Philosophy, Natural Philosophy, Mathematics, Metaphysics, Grammar, Rhetoric, Logic, Medicine, Music, Arithmetic, Geometry, Mathematical Science in general, Astronomy, Astrology, Optics, Ethics, Politics, Economics and the Unity and Simplicity of knowledge. Truly it was an encyclopedic work and one of much interest. At least five of the subjects discussed are clearly branches of science, and if the work might be definitely ascribed to Grosseteste, it would be of great value in helping to an estimation of his scientific ideas; but the latest scholarship[3] has seemed to identify this compendium with the "Divisio Philosophiae" of Dominicus

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[1] This work should be ascribed to William Occam, a famous Franciscan scholar of the early fourteenth century. He studied at Oxford and later at Paris: possibly was a pupil of Duns Scotus. His greatest fame was earned by his theological works, some of which brought him in conflict with the ecclesiastical authorities, led to a charge of heresy, and resulted in a short term of imprisonment at Avignon in 1327. Later he was excommunicated. From that time on, his writings became more political than theological, and a great many such treatises can be ascribed to him. He died at Munich C1349.

Only three scientific treatises can be attributed to him with any certainity; "The Philosophia Naturalis" or "Difficilia Naturalis Scientiae", "Quaestiones in Libros Physicorum" and "Super libros Physicorum". For a list of all his known writings see Little's "Grey Friars at Oxford"; page 225-234.

[2] Stevenson: "Robert Grosseteste, Bishop of Lincoln", page 49.

[3] See Baur's introduction to Grosseteste's philosophical works, pages 124-125.

Gundissalinus[1] and hence it can not be used in any attempt to define Grosseteste's place among medieval scientists.

The other treatise, the "Summa Philosophiae", is of much the same nature and can also be broken up into nineteen subdivisions treating all the different branches of knowledge then known. Theology, Metaphysics, Science, Philosophy all have their place, and the discussions are extended ones, making this an even more comprehensive treatise than the "Compendium".- The careful study of the work, however, which has of recent years been made by Professor Baur, brings out both internal and external evidence to indicate that Grosseteste could not have written it[2]. Just who was the author can not as yet be said.. Probably it was written by some one connected with the Oxford school, perhaps by some one working part of the time under Grosseteste's directions and with his supervision, possibly even by Roger Bacon himself, though that is hardly a tenable hypothesis. But whoever wrote it, it is almost certain that the author was one acquainted with Grosseteste's views and influenced by them. It undoubtedly very well expresses many of his scientific ideas and for that reason is valuable even though it can not be regarded as an independent work from the pen of Grosseteste himself[3].

In conclusion then, after this brief survey of the treatises accepted as authentic, it must be said that if an opinion is to be based merely upon the ideas and theories set forth in Grosseteste's scientific works, we are wellnigh forced to the judgment that Roger Bacon's tributes to Lincolniensis as a scientist were somewhat exaggerated and over enthusiastic.- His opinions on various matters were utterly erroneous, his theories in many cases were not sufficiently developed, his judgments were often very superficial. This is not to say that Bacon was wilfully exaggerating; by no means. The great admiration and love which he so clearly felt for his teacher may easily have blinded him to many of Grosseteste's weaknesses

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[1] Dominicus Gundissalinus, or Gundissalvi, a Spanish archdeacon of the first half of the twelfth century, was not only an independent scientific and philosophical writer of considerable prominence, but he was one of the most important translators of the Toledo school.

Besides translations, five works can be definitely ascribed to him, "De divisio philosophiae", very largely a compilation from Arab sources, "De immortalitate animae", "De processione mundi", De unitate", and "De anima"- De Wulf: "Histoire de la Philosophie Medievale (1912) pages 354-359.

[2] See Baur's introduction to Grosseteste's treatises; pages 126 ff.

[3] It is interesting to note that while Baur definitely rejects the treatise as a work of Grosseteste, he still considers the views it sets forth as being sufficiently identical with those of Grosseteste to justify printing it along with his other philosophical works.

and so led him to a too enthusiastic praise; and also it must obviously be borne in mind that Bacon's own limited knowledge on scientific subjects precludes him from being a competent judge according to modern standards. According to modern standards, Grosseteste's work in the field of science was often weak, and many of the results he obtained were unimportant.- But then, how could it be otherwise? Considering the disadvantages under which he worked, considering the lack of apparatus which without question greatly hampered him, considering the tendency of his age to rely so largely upon authority in scientific questions, considering the weakness of much of the previous work upon which he naturally had to build, is it at all surprising that some of his own conclusions and theories were weak; is it surprising that he often lost himself?

Surely we can not judge him according to modern standards. The wonder is that he wrought as well as he did.- Many of his ideas, though they were far ahead of the current ideas of his age, have now been superseded; none of his treatises would today be acceptable as scientific texts; but after all, it is not so much the ideas he set forth, nor the absolute results he obtained that should guide us in forming our judgment of him. The important thing is that he was a pioneer in medieval science; that he urged scientific study; that he called for new and better methods; that he put experiment in the place of authority, and that from what he did others too were prompted to do their work. It is to be regretted that the thirteenth century scientific revival did not last, that the impetus he helped to plant in the minds of men like Roger Bacon seemed to die out before reaching a full fruition; but that was not his fault. Other interests rushed in to check the promised scientific development, and, because of that, Grosseteste's influence did not reach as far or show itself as strongly as it would have done under normal conditions. But still he did his work, much of it ably and well, and for what he did we must grant him full credit.

CHAPTER IV

GROSSETESTE'S INTEREST IN LANGUAGES

Chapter IV

When the student considers Grosseteste's interest in languages and literature he is struck by the fact that on the one hand this man stands out as the forerunner of a great movement, and on the other hand he is to be regarded as one of the last champions of a cause that had waged its battle and lost. In both cases he was perhaps hardly aware of his own position. He does not as definitely advocate the study of languages, Greek, Hebrew, Arabic etc, as did Roger Bacon after him; he does not as clearly champion the study of the classics as did John of Salisbury[1] before him. But nevertheless in the one regard as in the other, traces can be found in him of the self same spirit and ideas that inspired these other men.

The Twelfth Century Renaissance[2] had not particularly concerned itself with the study of languages other than Latin; such an interest was to be aroused later. But it had very definitely concerned itself with the study of the classics, with the study of Latin literature, with the finest examples of expression in both prose and poetry.- This interest had never been wholly dead during the early Middle Ages. There had been other revivals previous to the twelfth century[3], but on a comparatively small scale; the twelfth century awakening was the most important until the time of Petrarch. As Chartres and Orleans had won great renown as schools devoted to classical learning, so lesser schools and countless individuals had felt the same inspiration. Men forgot, for the time at least, that the ancient authors were of another faith, that they were pagans; they merely remembered that these classics were the most splendid written records of another age, the history of men's lives, the re-

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[1] John of Salisbury (C1115-1180) an English author, diplomatist, and bishop. About 1136 he went to Paris and studied under Abelard. From 1138-1140 he studied grammar and the classics under William of Conches and Richard l'Eveque, disciples of Bernard of Chartres, though it is a disputed point whether or not he himself studied at Chartres. In 1140 he was studying theology at Paris and became an important ecclesiast. In 1170 he was made Bishop of Chartres.

His greatest works, were his "Polycraticus" and the "Metalogicus" which are full of information regarding the matter and form of scholastic education. They are both remarkable for a splendid style and a humanistic tendency.

[2] See Rashdall, the "Universities of Europe in the Middle Ages"; Vol.I, chapter II, pages 24-72, and Poole, "Illustrations of the History of Medieval Thought"; Chapters IV and VII.

[3] Particularly during the time of Charlemagne and of the Ottos in Germany.

cord of men's achievements, and as such they were of mighty value for those who chose to read them. They contained the summed up knowledge of the past, they were pregnant with lessons for the present, in some cases they opened a vista for glimpses into the future; they were altogether valuable.- It has been said[1] of John of Salisbury that his conception of literature at large can be expressed in the Biblical words "Whatsoever things were written aforetime were written for our learning"[2], and that conception was a very general one during this twelfth century revival. The classics were a source of human interest because, regardless of who wrote them, they contained vast stories of human knowledge.--Bernard of Chartres[3] says of Vergil","In as much as he is a philosopher, he describes the nature of human life[4]", and so he and others like him were to be studied that through such a study glimpses might be caught into the mystery of nature, into the mystery of life, into the vast storehouse of the experience and learning of other days. These glimpses would surely broaden the view point and extend the knowledge of him who gained them and so give a much better basis for his learning. Says John of Salisbury[5], "We are as dwarfs mounted on the shoulders of giants so that we can see more and farther than they; yet not by virtue of the keennees of our eyesight, nor through the tallness of our stature, but because we are raised and borne aloft upon that giant mass";--a statement that seems exceedingly well to show forth the spirit that prompted his humanistic interests.

This spirit then is the spirit that permeated the twelfth century revival of the classics; but unfortunately that revival did not last. Various causes[6] brought about its decline till Chartres and Orleans had lost their earlier reputation and the humanists had given way to the theologians and the dialecticians. By the middle of the thirteenth century only an occasional voice was raised for the classics and the famous French Allegorical poem "The Battle of the Seven Arts"[7] shows how completely lost at this time was the contest that a century before had seemed to be won. To Grosseteste's credit however, be it said that he was of the occasional few who

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[1] Poole:"Illustrations of the History of Medieval Thought";pg219.

[2] Romans 15:4

[3] Bernard of Chartres or Bernard Sylvestris(C1080-1167), a scholastic philosopher and, with his brother Theodore, among the chief members of the school at Chartres. He was a Platonist, and John of Salisbury ascribes to him a treatise attempting to reconcile Plato and Aristotle. Plato's "Timaeus" was in many respects his inspiration.--The only extant fragments of his writings are from a treatise "Megacosmos and Microcosmos"(Edited in 1876 at Innsbruck)--A real humanist.

[4] Quoted by Poole(pg.119)from Bernard's commentary on the first half of the "Aenid".

[5] Quoted by Poole(pg 119)from John of Salisbury's "Metalogicus" III,4 page 855.

[6] Paetow("Arts course at the Medieval Universities",1910;pp 20-30) gives and discusses the following reasons:"Strict clerical feeling against profane literature;Popularity in the schools of good medieval Latin literature;Renewed interest in science;Rise of the studies of Medicine and Law; Increasing popularity of Logic.

[7] "Les Bataille des VII Ars",(Translated into English by Professor L.J. Paetow)The text is found in "Oeuvres de Henri d'Andeli,Trouvère Normand du XIII Siecle";published by A. Héron at Rouen in 1880.

still felt the humanistic interest. Doubtless he did not feel it as definitely as John of Salisbury and Bernard had felt it, but still it moved him; it prompted him in some of his studies, and that it did, his acquaintance with the classics clearly shows.

Thus, from the stand point of his interest in literature, particularly in the Latin classics, Grosseteste was one of the last adherents of a twelfth century movement. It is in his advocacy of the study of other languages and in his own work along that line, that we can consider him a pioneer in a new field. Not that he was the only one of his day interested in such a work; by no means. There were other scholars, probably a good many of them, who as individuals found in their own personal interests enough of an incentive to impel them to such a study on a small scale; and also, along with, or just prior to the introduction of the "New Aristotle", there had grown up certain schools of translators[1] whose linguistic attainments can not be overlooked, though in many cases their actual knowledge was superficial, and as a consequence the results they obtained were weak and unsatisfactory. These individuals and these schools represent the same new movement in which Grosseteste stands out as a pioneer; but still there were relatively few Englishmen in the twelfth and early thirteenth centuries who were active in this regard, and among these few Grosseteste merits a prominent place.

In the face of this comparative indifference to the value of understanding languages other than the Latin, one hardly needs to say that there was thus early no organized teaching of languages in the universities proper. Berger, to be sure, says that Hebrew was taught at Oxford by the middle of the thirteenth century, though at no other medieval university[2]; but if this be true at all, it can not be taken to indicate any intensive study. Also there is sufficient proof to warrant the assertion that early in the thirteenth century there was established at Paris, perhaps by Baldwin of Flanders, perhaps by the pope himself, a college called the College of Constantinople which was designed to serve as a training school for the study of Oriental languages[3]. Apparently a religious purpose lay behind its establishment, and the hope of its founders was that in this school there might be a mingling of Latins and Greeks, the Greeks learning Western theology and the Latins studying Greek in order to fit themselves for service as missionaries to the East. Very little is known of the later history of this school, but its

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[1] Those in Sicily and at Toledo and Cordova were among the most famous ones.

[2] Berger: " Quam Notitiam Linguae Herbraicae Habuerint Christiani Medii Aevi Temporibus in Galia"; page 53.

[3] For a discussion of this college see Lefranc: "Histoire du College de France", pages 3-5; Jourdain: "Excursions Historiques et Philosophiques à Travers le Moyen Age"; pages 220-230.

period of usefulness was certainly a short one[1], and its influence was limited to comparatively few.

That there was during the middle ages this lack of systematic instruction in languages other than the Latin is an obvious fact. There was, of course, an interest in languages, yet it was the interest not of organized groups of scholars but of individuals, some of whom laid the basis of their interest on a desire to make Oriental learning accessible to the West through translations; some of them were interested in Greek, Arabic, Hebrew etc. because they saw in a knowledge of these languages a means for furthering missionary enterprises; some of them saw in such a knowledge an aid to greater skill in Biblical criticism; a very few still had the humanistic attitude, but almost none, if any at all, had a purely philological interest in such a study. It is however, to these various individuals rather than to schools or Universities that we must look in seeking to form an estimate of the extent to which languages were studied during this period.

Naturally among these individuals there were varying degrees of proficiency. Roger Bacon[2] classified the skill attainable under three heads. The highest degree was that which enabled a scholar to use other languages as fluently as he used his own mother-tongue; the next degree gave one the ability to translate in scientific style from the acquired language to his own tongue, while the third and lowest degree merely indicated sufficient knowledge to translate roughly, to know elementary grammar and to understand the references to such languages as found in commentaries of the Fathers upon the Scriptures.

On the basis of this classification we must say, as Bacon himself said, that there were very few who attained to the highest degree, that there were not a great many who possessed even the second rate skill, and that the third-rate ability, while possessed by a considerable number, in many cases led to very crude and imperfect work in the field of translation.

Bacon himself gives us some insight into the status of language studies in the thirteenth century, when he tells us that there were many among the Latins who could speak Greek and Arabic and Hebrew, that is, who possessed the third-rate skill - but that there were very few who had any knowledge of the grammatical rules of these languages or any ability as teachers of them. Indeed he says, "There are not four Latins who know the Hebrew, Greek and Arabic grammar", and of this he claims to be certain because he says he has searched far and wide for any such. If this be taken to mean that there were not in his day four among the Latins who had that highest de-

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[1] In 1363 only a single foundationer remained in its dilapidated buildings, and he was persuaded to make its property over to the College de la Marche. Rashdall, "Universities of Europe," Vol. I, pg. 486. Cited from Bulaeus' "History of the University of Paris)

[2] "Opera Inedita" (Ed. Brewer) "Compendium Studii Philosophiae" VI; pp. 433-434.

[3] "Opera Inedita," In "Opus Tertium" X pp. 33-34.

gree of proficiency in any one of the languages, probably he was correct; or if it be taken to mean that there were not four who had even a second-rate proficiency in all three languages, again the judgment was probably correct; but if we consider it as intended to signify that there were not four who had better than a superficial knowledge of at least one of the three languages he names, then the statement was surely an exaggeration.

The field concerned with the study of languages during this century has not as yet been very carefully reviewed, but as it is investigated, more and more names are added and will be added to the list of those who had a reasonably good knowledge of some tongue besides their own and who did important service either as teachers or as translators. For a knowledge of Greek, without going outside of English names, we can cite Daniel de Morlai[1], Michael Scot[2], John of Basingstoke[3], William de Mara[4], Adam Marsh,

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[1] Daniel de Morlai, who lived in the latter part of the twelfth and the first of the thirteenth centuries, studied for a time at Paris, but became disgusted with the methods of the philosophers there and so went to Toledo to study under Arab masters, particularly in the branches of the Quadrivium. It was while here that he probably gained his knowledge of Greek and Arabic. After some years in Spain he started back to England, but well nigh gave up the journey when he learned how Greek was neglected in England. Finally however, he was persuaded to go on and was one of the first to introduce Greek codices to that country.(Gasquet: "The Last Abbot of Glastonbury and other Essays"; pages 145-147)

[2] Michael Scot (CII75-1232) was educated at Oxford and possibly at Bologna and Palermo. He was a member of the school of Frederick II in Sicily and later joined the Toledo school of translators. With others he was instrumental in making the Western world acquainted with Aristotle.

Some of his translations were probably from Arabic versions and some directly from the Greek. Bacon speaks rather slightingly of him (Compendium Studii Philosophiae; pages 471-472), but he must have had a fair knowledge of both Greek and Arabic. (Nolan: Introduction to the "Greek Grammar of Roger Bacon"; pages XLIX-LIII)

[3] John of Basingstoke:- See pages 60-61 of this chapter.

[4] William de Mara (died C1310), an English friar, theologian and member of the Oxford school; studied probably at both Oxford and Paris. Roger Bacon, though he never uses his name, calls him the "homo sapientissimus"(Opus Tertium; page 89) and pays very great tribute to his knowledge of Greek and Hebrew and to his work for Biblical Criticism. (Opus Tertium; pages 89 and 94). He wrote various works of a theological nature, the most important of which, published in 1284, was an attack upon the teachings of Thomas Aquinas, the "Correctorium Operum fratris Thomae". In all probability he was the author of the "Correctorium Vaticanum", a great work in the field of Biblical criticism and one that shows a very high knowledge of Greek and Hebrew. (See Nolan's introduction to the "Greek Grammar of Roger Bacon", LVIII-LIX; and Gasquet's Essay on Biblical Criticism in the "Last Abbot of Glastonbury and other Essays", pages 137-140).

Thomas Wallensis[1], Grosseteste and Bacon himself, while there were very likely others of whom we have not yet learned. The Crusades, the fall of Constantinople in 1204, more active relations between East and West without question brought it about that many whose names we do not even yet know came into contact with Greek students of the East and learned enough of their language to be able to take over much of their learning.

As far as the study of Hebrew is concerned we are on even less certain ground, and our very limited knowledge where it seems that a good deal ought to be known, impresses one with the need of an intessive study into this period. There are very strong evidences to lead us to believe that a considerable number of Englishmen must have had some knowledge of Hebrew, and yet we know the names of very few to whom the credit for such knowledge can with certainty be given. The desirability of the study and the opportunities for it were so obvious ,and the number of manuscripts extant today which show clear signs of a good translating knowledge of the language is so large[2] that we are almost forced to believe that there was a higher developement of Hebrew than of Greek scholarship during the thirteenth century but that we know less about it.[3] Of course there was a reason why many Hebrew scholars probably worked in secret and were unwilling that their names should be attached to their manuscripts. The study of Greek, we are told, was opposed by many because the Greeks were looked upon as heretics and not of the true faith, while Greek scholars such as Aristotle were altogether infidels. But yet the opposition to the study of Greek was less bitter than that to the study of Hebrew. To the mass of Englishmen, the Jew was a despicable creature; not only a heartless money-lender, but a sorcerer and a man of mystery. Hebrew books were looked upon as repositories of magic knowledge, their strange characters were signs of a cabalistic art, and the Jew himself was suspected, feared and hated as a master of occult practices.[4] Hence to the common run of people a scholar who showed an interest in these people or in their books became an object of suspicion and was very apt to place himself in peril, a danger from which secrecy was the best safeguard. In this fact we find one reason why Hebrew was not studied more than it was, why many of those who did study it somewhat sought to conceal their identity and the results of their work, and why our knowledge of such students is so limited today. For this whole period of the twelfth and thirteenth centuries there are only a

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[1] Thomas Wallensis:- See note on page 16

[2] Berger in his "Quam Notitiam"etc. cites eight such manuscripts now extant in libraries of Oxford and Cambridge and refers to others that he has not seen. The eight which he cites contain, in all,the translation of about one half of the entire Bible from the original.

[3] See Perry: "Life and Times of Robert Grosseteste", page 40

[4] S. A. Hirsch: "Early English Hebraists" in the "Jewish Quarterly Review" of October 1899; page 35.

very few English names that we can mention;- Andrew the Englishman[1], William de Mara, Roger Bacon[2], Grosseteste, Adam Marsh- and even here, as far as these last two are concerned, we have very little evidence on which to base a conjecture that they can be classed among Hebrew scholars[3]. More than these there must have been, but who they were and how far their knowledge went has not yet been discovered.

When one thinks of the introduction of the "New Aristotle" and remembers the source from which it first reached Northern Europe, the hazard is quickly made that there were many Latins who had at least a translating knowledge of Arabic. And of course it was most natural that this should be so, because of the close proximity of the Arab- Moors to the Latins of France and England. The twelfth and thirteenth centuries witnessed both individuals and schools that were much interested in the work of translation. The colleges at Toledo and Salerno drew to them such men as Gerard of Cremona[4],Michal Scot, who was probably aided in his translations by one Andrew the

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[1] Andrew the Englishman(C1150),an Augustinian monk. He is credited with commentaries on the greater part of the Old Testament and on the Book of the Maccabees. Roger Bacon refers to him(Comp, Stud. Phil. VIII, pages 482-483)as one who altered the Vulgate in accordance with the Hebrew text and praises his knowledge of Hebrew though he rather censures him for his daring in altering the Vulgate.(Nolan: "The Greek Grammar of Rogar Bacon"-Introduction LXIV; and Hirsch in "Early English Hebraists;" page 44)

[2] Bacon unquestionably had a knowledge of Hebrew, as a Hebrew Grammar, of which only a fragment is now extant, has been definitely ascribed to him.-See S. A. Hirsch in "Early English Hebraists,"and the same author in Nolan and Hirsch's "Greek Grammar of Roger Bacon"; pages 197-208.

[3] For Grosseteste's knowledge of Hebrew see pages67-71Bacon speaks of Adam Marsh as one who had some knowledge of the language ("Opus Tertium" in"Opera Inedita"; page 88.

[4] Gerard of Cremona(C1114-1187), a pupil of the Toledo school of translators, was especially famous for his translation of the Arabic version of Ptolemy's "Almagest", which, if it was not the first Latin version of that work, was at least the standard version till the fifteenth century. This work was completed in 1175. He was also noted as the translator of many of Aristotle's works, of the "Tables" of Arzachel, and of Alfragan's "Elements of Astronomy". No less than sixty-seven translations have been ascribed to him, but in all probability some of these were not his work.

Jew[1], Alfred the Englishman[2], Herman the German[3], Archdeacon Dominicus Gundissalinus[4] who headed a band of translators in the employment of Raymond, Archbishop of Toledo, and Daniel de Morlai[5]; while at the courts of Roger II and Frederick II in Sicily and Alphonse X in Spain, there were drawn together learned men of many nationalities who devoted much of their time to translations from the Arabic and to a fair mastery of that language.--Hence we see that while Bacon's statement that there were not four Latins who knew perfectly the Oriental languages may have been true, still there were many who had an active interest and some degree of skill in one or more of these tongues.--

Unquestionably Grosseteste must be reckoned among those who had a very real interest in language study, as he had in literature. Just how much knowledge he had of any one language it is difficult to say with certainty, but his work is surely witness enough to prove his interest. He can not rightly be called a philologist in the technical sense of the word; probably no scholar of the Middle Ages could be so termed. Bacon seems to have come as close as any to that distinction, and yet by no means can it be said even of him that the philological instinct was the chief impetus to urge him to his language--studies; and if that can not be said of Bacon, still less truly can it be said of Grosseteste.

To the work of both of these men in the field of languages mixed impulses undoubtedly entered in. Granting without argument that they saw in the power to translate, particularly from the Greek and Arabic, a means of making accessible to the West vast stores of hitherto inaccessible Eastern learning and that a shear desire for knowledge led them to work for such translations; granting also for the time being that they were prompted by the humanistic spirit that had marked the study of the classics in the previous century, we have still to seek a deeper purpose in their activities. Bacon gives us a clew to that purpose when he says,"The Latin language itself is for the greater part composed of Greek and Hebrew,and there-

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[1] Roger Bacon refers to this Andrew the Jew as a fellow-worker with Michael Scot.(Comp.Stud.Phil.pg 472)

[2] Alfred the Englishman(C1260)was a translator in the employ of Manfred, the son of Frederick II. We know little of his work, but Bacon speaks of him as one who made many translations("Opus Tertium" page 91.)

[3] Herman the German lived in Toledo between 1240 and 1260. He turned into Latin Arabic versions of the Ethics,Rhetoric and Politics of Aristotle and commentaries of Al-Farabi(870-950) and Averroes.

[4] Gundissalinus probably knew little Arabic himself, but he employed as assistants Arab speaking Jews, the most important of whom was a christianized Jew who went under the Arab name of Ibn Dawud that is John David or John of Spain. These translators concerned themselves largely with translating Avicenna's works, but other Arab treatises as well were also turned into Latin.(See Suter's"Die Araber als Vermittler der Wissenschaften" etc.,pages 19-20)

[5] For Daniel de Morlai see note on page 50

for Latins can know nothing worthily without a knowledge of these languages"[1] That is, he saw, as Grosseteste certainly also did, that a knowledge of other tongues, Greek, Hebrew, Chaldean, Arabic, was very desirable and indeed necessary for a perfect mastery of the Latin language and grammar. In this of course there is a hint of a purely philological spirit, of a tendency to trace many languages to a common root, but this tendency did not lead either Grosseteste or Bacon very far.- They merely set forth an idea very similar to that which we hold in regard to language- study today. A modern champion of the study of Latin and Greek will maintain- and rightly- that a knowledge of these languages is a very great aid toward a mastery of English, because so many English words come from Latin or Greek roots. Bacon and Grosseteste maintained the same thing in regard to the study of Greek, Hebrew, Arabic, and Chaldean,- that it gave one a far better basis for a perfect understanding of Latin.

Another reason must be considered. Mention has already been made of the grossly inaccurate translations of Aristotle's works; an accurate knowledge of Greek would enable a student to correct these translations. But if Aristotle, scientist and philosopher, had suffered in translation, the Scriptures and the Fathers had also grievously suffered. Hence a desire for Biblical criticism and Biblical corrections is a very potent reason for the study of languages, a reason that in the case of Grosseteste at least was probably the most potent of influences.

The Old Testament of course had originally been written in Hebrew, the New Testament and most of the Fathers in Greek; and hence all Latin versions were merely translations, and, at that, by no means first-hand translations. The Vulgate, itself a translation, had been the accepted text of the Scriptures, but in course of time, because of the errors of copyists and because of ill advised and ignorant changes in its text, a very great many corruptions had crept in. By Grosseteste's time a woeful state of affairs existed; different translations and different versions varied so that it was well-nigh impossible to know which version should be accepted, if indeed any version was worthy of acceptance. And the same thing was true of the writings of the Greek Fathers. Confusion reigned, and every new attempt at correction only seemed to make matters worse. Roger Bacon later on said[2] that corrections attempted in all sincerity and earnestness really became most pernicious corruptions.

As a remedy for this condition, Grosseteste believed, as did Bacon after him, that one of the surest means was to be found in a study of Greek and Hebrew. With these languages once mastered and with Latin grammar and constructions also thoroughly understood, the Bible student would be in a position to work out the needed reforms. He could go to the most ancient manuscripts[3], he could compare them with one another and with the more recent Latin versions; he could

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[1] "Opus Tertium" in "Opera Inedeta", page 33

[2] "Opus Majus", Ed. Bridges ; page 78

[3] See Gasquet's "English Biblical Criticism in the Thirteenth Century" in the "Last Abbot of Glastonbury"; pages 132 ff.

translate anew where that seemed desirable, or he could merely correct if that seemed sufficient. By such a process of comparison, translation, and elimination of error, the Scriptures and the Fathers could once more be brought to their pristine purity, and a splendid service would have been done the church and religion. And how worthy and necessary a reform this must have seemed to Grosseteste can be inferred from what has already been said in another connection about the importance that he placed upon the study of the Scriptures[1]. Greek and Hebrew would aid in a correction of this literature and in a better understanding of it, and therefor the study of these languages was very desirable.

As still another impulse to their work, let it always be remembered that Grosseteste and Bacon were actuated by the humanistic spirit.- Whether it was Greek, Hebrew, Chaldean, Arabic, or Latin that they studied, there was impellant in them the desire to get to the written record of men's lives, to learn from the knowledge of the ancients, to come into a sort of spiritual touch with those who had lived and worked and achieved in other days; for they found in these ancients a spirit that after all was not so widely different from their own. They were eager to learn all that they could from their own observation, study and experiment, but still they realized what an inestimable benefit might accrue to them in their search for knowledge if only they could avail themselves of what the experience and study of other centuries had wrought out. The written page of earlier days had great lessons for them, and it mattered not whether these lessons were put down by pagan or by Christian hands, in Latin, Greek, or Hebrew, if only they tended toward the truth. To get the truths of life, of Nature, of the Mind and Soul, and of the world in general,--that was a worthy goal at which to aim; and they knew that the ancients offered them much on which to build. In every language they saw a means whereby they might come nearer to a knowledge of the truth as it appealed to other men and so make themselves more fit to carry on their own search for truth.

Hence it was that Bacon and Grosseteste were, to a certain extent at least, acted upon by the twelfth century classical interest. How that interest showed itself in Bacon's works does not concern us here; but for abundant proof that Grosseteste felt the interest, for sufficient evidence that he knew and highly esteemed the ancients, one need make no more than a very cursory examination of his writings.- With only his so called "philosophical "treatises accessible, one finds Vergil, Ovid, Pliny, Horace, Solinus, Seneca, Cicero, frequently cited[2] to say nothing of the many references to Plato, to Aristotle and to various Greek scientists and mathematicians who of course are in another category,--while it is reasonable to believe that his other writings, if made accessible, would furnish still other examples to show forth in his interest in the classics. And that interest, that

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[1] See Chapter II, page 19

[2] In the "De Sphaera" he refers to or quotes from Vergil and Ovid; in the "De Natura locorum", Pliny, Horace and Solinus; in the "De libero arbitrio", Seneca and Cicero.

humanistic tendency to make languages and literature a means for delving into the records and the learning of the past must be looked upon as one of the impelling motives in all Grosseteste's language studies.

We can then with reasonable certainty say that Grosseteste's interest and activity in the study of languages was prompted by a five-fold purpose;1 to serve the humanistic spirit, 2. to secure better translations of works already known, such as the treatises of Aristotle, 3. to make other Eastern learning accessible to the West, 4. to secure a greater mastery of Latin through a knowledge of its root-forms, and 5-the reason which to his mind was probably chief of all- to serve the end of religion by aiding in Biblical criticism, in a better understanding of the Scriptures and of the Holy Fathers.- These were the ends he in all probability had in mind; we should now inquire to what linguistic achievements his interest led him.

Grosseteste certainly knew something of at least four languages in addition to Latin and English. On his knowledge of Latin we need not dwell; it was the learned language of the age and that he had a splendid command of that tongue his many treatises abundantly prove. English, in his day, was far less frequently used in writing, though it was the language generally used in the speech of the common people. A few of Grosseteste's sermons and some of his "Dicta" are in that tongue,and from this fact his knowledge of the language is clearly shown. That he knew these two languages is not at all strange; but his knowledge of the other four deserves a somewhat fuller discussion.

I Greek:- We know more of Grosseteste's ability as a Greek scholar than of his accomplishments in any other language save Latin, and yet even here our knowledge is by no means complete, and we can give only conjectural answers to many questions in regard to his proficiency in that tongue.

Where did he gain his knowledge? By whom was he taught? We can not definitely say. All evidence, and particularly Roger Bacon's testimony, goes to prove that his earliest knowledge of Greek was very superficial and that it was not until his later years that he had any real proficiency in the language. Bacon says[1] that while Grosseteste knew languages sufficiently well to understand the Fathers, the philosophers and the wise men of the ancients, he did not know them well enough to translate till near the end of his life, when he sent for Greeks to bring books on Greek grammar to England and to aid him in his work. That is, his knowledge was a growing knowledge, his proficiency ever increasing. His earliest acquaintance with the language was in all probability gained during his university days, but certainly not through any formal university instruction. Individual Greeks probably were his teachers. As there were many Hebrews in England at the close of the twelfth century, so also there were some Greeks,

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[1] "Opus Tertium" XXV; page 91 of Brewer's Edition.

frequently men of considerable learning, in both England and France, and the chances are that either at Oxford or Paris, and perhaps at both places, he came in contact with some of these and was given his rudimentary instruction by them. Indeed, we have the name of one such, Nicholas the Greek, whom Grosseteste is said to have known at both Oxford and Paris[1]. We know positively that this Nicholas was connected with his later work, though the assertion of this earlier relationship lacks definite confirmation. However it is reasonably probable , and we are justified in saying that it was through some such means that Grosseteste acquired his first knowledge of the Greek tongue.

With the rudimentary knowledge once obtained and with the ideas that he held in regard to the value of language study, we can feel sure that his proficiency would increase. Undoubtedly he never possessed the highest degree of proficiency; undoubtedly, as Bacon tells us, he was not a finished translator till his old age; undoubtedly he often had to rely on assistants and collaborators; but still he was prompted by a real interest, and in time he did attain to a considerable degree of skill, as some of his works abundantly show.

Grosseteste clearly used the knowledge of Greek that he gained in two distinct fields, as a commentator, and as a translator; his commentaries for the most part coming in an earlier period of his life than his translations.

At first thought one might see no reason why his commentaries should be included among his accomplishments in the domain of language study; nor would there be much reason for such an inclusion if Grosseteste's method as a commentator had been to merely take a Latin text and explain or discuss it. But in general that was not his method. Whenever it was possible to have an original manuscript before him, he was not content with mere translations. There were times probably when the original Greek was not accessible, but when it was, he used it, together with as many translations as seemed desirable. It was through a process of comparison that he reached his conclusions in regard to the meaning of the original author, a comparison of the different translations, and of the translations with the original Greek text.- Frequently in his commentaries he speaks of the translations of others, and of varying versions, and by such expressions shows clearly that he had different manuscripts before him for comparative purposes[2].- Under such a method then, his knowledge of Greek would be a valuable aid in preparing his commentaries, and the use he made of it in this connection was undoubtedly one means of developing a greater proficiency for his translations later on.

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[1] See Stevenson: "Robert Grosseteste Bishop of Lincoln", pages 21 and 226. For further reference to Nicholas the Greek see pg.60

[2] See Baur's introduction to Grosseteste's philosophical treatises; pages 37-39.

Just as many translations and many independent treatises have been falsely ascribed to Grosseteste, so several commentaries have been ascribed to him with which he probably had no connection[1]. Others however can be definitely credited to him. It will not be necessary to discuss them here, but they may at least be named in passing.

On the Physics of Aristotle:- This commentary and the pseudo commentary" on the eight books" have already been spoken of in connection with Grosseteste's scientific works[2] and need not be again characterized.

On the Posterior Analytics of Aristotle:- This is one of Grosseteste's strongest commentaries and one that, to judge from the number of extant manuscripts of it, must have been held in exceedingly high esteem. It is a clear exposition of Aristotle's views as they appeared to Grosseteste, but throughout it the author refuses to withhold criticism from the "Philosopher" when he thought criticism was merited. He boldly criticizes Aristotle for lack of clearness in some places and laments the fact that many scholars instead of daring to censure a jumble of ideas, have pretended to find nice distinction of meaning in the confusion.--Prantl pays special tribute to this commentary and stamps it as a thoroughly good piece of work[3].

On the Sophistici Elenchi of Aristotle:- In importance this does not rank with some of the other commentaries; only one thirteenth century manuscript of it is extant, but it is plainly to be ascribed to Grosseteste. It was probably the first medieval Latin commentary on this work.

On the Nichomachean Ethics of Aristotle:-This will be mentioned later in connection with Grosseteste's translations.

On Boethius "Consolation of Philosophy":-The authenticity of this commentary is still somewhat in doubt. Baur seems inclined to reject it[4],but Stevenson[5],Haureau[6], and others accept it without question. Only a careful study of the manuscript can decide the matter,and until such a study is made the work must be considered as "probably Grosseteste's". That he was wholly familiar with Boethius is obvious from the number of quotations or references taken from that source which he uses in his own treatises[7].

On the works of the pseudo--Dionysius the Areopagite:- These will also be considered in connection with Grosseteste's translations and hence will be passed over here.

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[1] Among the commentaries thus falsely ascribed are those on the "Prior Analytics",the "Logic",the "Predicaments"the "De Caelo et Mundo", the "De Generatione et Corruptione", the "Meteorology" and the "Metaphysics" of Aristotle.

[2] Chapter III, page 40

[3] Prantl: "Geschichte der Logik im Abendlande";

[4] Baur's introduction to Grosseteste's philosophical treatises; pages 46-48

[5] Stevenson:"Robert Grosseteste Bishop of Lincoln"; page 45

[6] Haureau:"Histoire de Philosophie Scholastique";part 2,Vol.I,pg175

[7] In the "De libero Arbitrio",the "De Anima",the "De lineis, angulis et figuris"and in other places as well.

Coming then to Grosseteste's work as a translator, one is almost immediately led to inquire whether he was an independent translator or whether he was merely the instigator of translations while others did the actual work. If he was an independent translator, then we need seek no further for evidence that he was an able Greek scholar; but if, on the other hand, he was a promotor rather than the actual translator, then we can only consider the translations as throwing light on his interest in languages and in the humanistic desire to get at the record of the past and learn through it, and not on his abilities as a linguist. It is a rather difficult question to answer and any attempt to answer it at all leads naturally to a consideration of the means and method employed in the translations ascribed to him.

Beyond a doubt his later translations were far more literal and finished than his earlier ones. In his first efforts he probably did no more than attempt to give the general sense of the work he was translating, with notes of his own upon it. This is indicated by his own words in one of his letters[2] in which he speaks of a translation of a treatise on the Monastic State[3] which he had made and sent to the Abbot and Convent of Peterborough. He says,"I have not communicated to you the words as I found them there, because they are different from the Latin; but I have extracted according to the measure of my own skill the sense of the words, adding to them a few others for the sake of elucidation". This certainly can only indicate a loose translation, and it is probable that Grosseteste's earlier attempts went no further than that.

In later attempts however, as, for instance, in his translation of the "De Divinis Nominibus" of the pseudo--Dionysius, he was far more exact and well-nigh technically perfect. Not that he was content with a mere word for word translation; his own comments and elucidations were still added, but nevertheless he kept very close to the text and the structure of the original.

It is not however, to be inferred that this greater exactness and polish characterizing his later translations was due only to an increased proficiency on his part and a greater mastery of Greek. That undoubtedly was a factor, but other elements also entered in. In the case of the translation concerned with the monastic state,he probably worked independently, and hence his imperfect knowledge of Greek necessitated a crude and far from literal translation; but in the case of his later and more important translations, he had collaborators and assistants and hence was able to put forth more finished productions.

Reference has already been made[4] to Bacon's statement that Grosseteste summoned Greeks to his assistance, and Nicholas the

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[1] Epistle 57; page 173 of Grosseteste's Epistles as Edited by Luard.

[2] The work he refers to was probably the "Regulae" of Basil the Great,Bishop of Caesarea and one of the great churchmen of the fourth century. The "Regulae" were written for the guidance of the Basilian monasteries.

[4] Chapter IV, page 56

Greek has been named as one of those who aided him. This man whose acquaintance Grosseteste had possibly made at Oxford or Paris, had been clerk to the Abbot of St. Albans and later became an inmate of Grosseteste's own household, where he served as an assistant to the Bishop in his studies. Later on, as a sort of reward for his faithfulness, he was presented with a church living in connection with the Convent of St. Albans, and to the end of Grosseteste's life remained on very cordial terms with him. He of course had a thorough knowledge of Greek, and that, coupled with Grosseteste's mastery of the subject matter of the treatise to be translated, made the two of them excellent collaborators in the work.

Another assistant, and one whose name is even more important than that of Nicholas Graechus, was John of Basingstoke, the Archdeacon of Leicester, of whom Matthew Paris gives us some interesting information[1]. He was much more of a scholar than Nicholas the Greek probably was, being thoroughly trained in the "Trivium"and "Quadrivium" and skilled in Latin and Greek; and because of his excellent scholarship he would be all the more valuable to Grosseteste. He had traveled in foreign countries and learned Greek in Athens itself. Indeed we are told[2] that Grosseteste sent him to Athens for the purpose of learning Greek, of preparing a Greek Grammar, and of bringing Greek manuscripts back to England; and whether or not it is true that Grosseteste sent him abroad for those purposes, it is certainly true that he accomplished all three of them[3]. He himself brought back to England many valuable Greek manuscripts in the translation of which Grosseteste was much concerned, and it was through him that Grosseteste learned of still other treatises[4] which were later procured.

Other Greek scholars too, perhaps native Greeks, were probably used as copyists and as less important assistants, but these two already named were undoubtedly Grosseteste's chief collaborators, though it may possibly be that Adam Marsh also assisted him in some of his translations[5].

It may be affirmed then that for the more finished translations Grosseteste and his assistants worked together. Manuscripts were brought from the East and South, probably at Grosseteste's direction,

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[1] Matthew Paris: "Chronica Majora"; (Ed. Luard)V; pages 284-287.

[2] Baur: "Das philosophische Lebenswerk des Robert Grosseteste"; pages 64-65.

[3] The Greek Grammar which he prepared or translated he called the "Greek Donatus".

[4] Among the manuscripts thus translated, the most important one that John of Basingstoke himself brought back was the text of the works of the pseudo-Dionysius the Areopagite, while the most important one of which he told Grosseteste was the "Testaments of the Twelve Patriarchs".

[5] This however is little more than a conjecture and can not be supported by direct evidence.

and the translation of the more desirable ones was undertaken. If there was accessible more than one copy of a treatise, the comparative method was used as in the commentaries. In the translation itself an attempt was made to keep as close as possible to the original text and syntax, and thus make an almost literal translation;but when this did not make the meaning of the subject matter as clear as Grosseteste desired, he did not hesitate to add his own comments and annotations. Clearness, very properly, was looked upon as more important than a word for word translation, and the chief aim of the translators seemed to be to carry over into the Latin the exact shade of the ideas set forth in the Greek.

The translations that can definitely be ascribed to Grosseteste and his corps of assistants are not so very many in number, and yet some of them were of considerable importance, and all in all they constitute a very creditable work for a man who was much of his time as busy with other things as was the Bishop of Lincoln. Just a brief word should perhaps be said about the more important of these works.

The Nichomachean Ethics of Aristotle:--This translation in all probability was not effected till the later years of Grosseteste's life, though he certainly had for a long time been acquainted with the treatise. It was a translation of much merit and probably was the version later used by Thomas Aquinas and Albertus Magnus in their study of the same work[1]. Only one manuscript of it however seems to be extant today, and hence it can not have had the circulation among his contemporaries and immediate successors that some of his other works had.

It has already been said that a commentary on this book of the Ethics may be ascribed to Grosseteste. That he was concerned with such a commentary we have strong evidence[2], and yet it may be that it was not a wholly independent work. Baur, from his latest study of the manuscripts,seems to incline to the view that Grosseteste's so-called commentary was merely a translation of the commentaries on the same treatise by Eustratius[3] and by Michael of Ephesus[4](for the

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[1] Baur:"Das philosophische Lebenswerk of Robert Grosseteste",pg66

[2] For a discussion of this commentary and the evidence for and against its genuineness see Baur's introduction to Grosseteste's philosophical works; pages 24-29 .

[3] Eustatius(Eustratius) d. 1193. At one time a teacher of Rhetoric and later Archbishop of Thessalonica. He was important for his religious writings, of which the chief was probably his treatise on "The Reform of the Monastic Life", and for his commentaries on ancient writers. Among these, in addition to his commentary on the "Ethics" of Aristotle may be cited commentaries on Pindar and on the "Iliad" and "Odyssey" of Homer.

[4] Michael Ephesius or M. Constantine Psellus (1018-1078) was a statesman,scholar, and author.Studied at Athens and Constantinople;became Professor of Philosophy at Constantinople, but gave up that position to become Secretary of State to Constantine IX,which place however he held only a short time.- As a scholar he was a very prolific writer.Besides the commentary here referred to, he wrote on subjects embracing politics,astronomy, medicine, music, theology, law, physics, grammar,and history.

fifth book), with certain additions or annotations that Grosseteste himself regarded as important and enlightening. Whether or not that is not true can not be definitely affirmed as yet, but even if it is, Grosseteste's additions and annotations would still entitle him to be called a commentator on the work, while also he would have to be given the credit for translating the earlier commentaries of Eustratius and Michael of Ephesus.

The Testaments of the Twelve Patriarchs:- This is one of the treatises of which John of Basingstocke brought back a report to Grosseteste and for a copy of which a messenger was sent to Athens. Its translation, throughout Grosseteste's time, was regarded as of great importance. The work[1] was reported and generally accepted as being an integral part of the Hebrew Scriptures, but a book which had been suppressed by the Jews because of the prophetic references in it to Christianty and the Messiah. Grosseteste's interests as a churchman and a particular desire to bring about the conversion of the Jews caused him to consider this spurious work as one of great value, and so in 1242[2] with the aid of Nicholas the Greek it was translated word for word into the Latin.

Of something the same character as the above work is another translation of recent years ascribed to Grosseteste[3]; the translation of a Greek romance treating of the life of Asenath, the Egyptian wife of the patriarch Joseph. The work however, even if authentic, is of little importance.

Treatise on the Monastic State:- This has already been referred to[4] as one of the earlier and less perfect translations. As far as the subject matter is concerned, the work is of no particular moment, but as casting some light on Grosseteste's knowledge of Greek, it is worthy of notice. It is interesting to note also that the letter in which Grosseteste speaks of this treatise contains some etymological reflections on the origin of the word "Monk". Many Greek words are used, and the letter itself therefore indicates at least a practical and usable knowledge of the language.

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[1] An English translation was published in 1872 by the Rev. R. Sinker D. D. Mr. Sinker, who probably has studied the work more closely than any other student, regards it as a piece of Christian literature belonging to the latter part of the first or the early part of the second century. It probably did not have a Hebrew original, though it was intended for Hebrew readers. The author of course is unknown. (See Stevenson: "Robert Grosseteste Bishop of Lincoln"; page 228 and note).

[2] Matthew Paris:- "Chronica Majora", IV; page 232. (Ed. Laurd).

[3] M. James:- "The Christian Renaissance" in the Cambridge Modern History; Vol. I, page 586.

[4] Page 59.

The Epistles of St Ignatius:- This is a translation of the so called "Middle Form"[1] of the Epistles, and there can be small doubt that it is rightly to be ascribed to Grosseteste. It may be that the manuscript employed for the translation was brought to England along with the manuscript of the "Testaments of the Twelve Patriarchs", as these two have frequently been found bound together; that however is only conjectural. The translation is an extremely literal one, and the Latin construction is often sacrificed in order that the Greek construction may be closely followed; indeed, new or unusual Latin words are often introduced in order that the text may as nearly as possible follow the original. As a finished work, it is by no means comparable to some of Grosseteste's other translations[2].

Very commonly ascribed to Grosseteste[3], largely on the authority of Boston of Bury[4], has been a translation and commentary on the Greek Lexicon of Suidas. The authenticity of this has recently been denied by Baur[5], who however does not give proofs for his statement. Its genuineness therefore must still be considered as doubtful, though the probability is that Grosseteste did no more than render into Latin a few of the more important biographical notices in the Lexicon[6] the principal one being an article on Jesus Christ. However, even if but little was translated and that imperfectly, still the mere fact that Grosseteste possessed a copy of the Lexicon in Greek is interesting and enlightening.

Roger Bacon[7] speaks of translations made by Grosseteste from the writings of John of Damascus, but this work, if genuine at all,

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[1] Three different Forms or "Recensions" exist; a Short Recension containing only three epistles, to the Ephesians, to the Romans, and to Polycarp; the "Middle Recension", containing these three in a fuller form and four others, to the Smyrnaeans, to the Magnesians, to the Philadelphians and to the Trallians; and a Long Recension, containing the seven epistles of the Middle Form with six others.

[2] For a good account of this work, Grosseteste's connection with it and the evidence on which it is ascribed to him, see Lightfoot: "The Apostolic Fathers"; Vol. I. pages 76-80.

[3] By Tanner, Pegge, Stevenson, Luard and others.

[4] Boston of Bury (Ca.1410) An Augustinian monk of the Abbey at Bury St. Edmunds. His great service to scholarship lay in the fact that he traveled over most of England visiting the libraries at the various monasteries, noting down the titles, author's names, and opening words of books and manuscripts. The result of his labors he set forth in a sort of great library catalog.

[5] See his introduction to Grosseteste's philosophical works; pg.49

[6] See James: "The Christian Renaissance" in Cambridge Modern History Vol. I. page 586.

[7] "Compendium Studii Philosophiae" In "Opera Inedita" (Ed. Brewer) page 474.

seems to resolve itself[1] into nothing more than a rough commentary on the Latin version of the treatise "de Fide Orthodoxa" made in the twelfth century by Burgundio of Pisa[2].

The works of the pseudo Dionysius the Aeropogite[3]: John of Basingstoke had brought the Greek text of this work back to England with him, and its translation, mentioned as a work of great importance by Roger Bacon[4], probably occupied Grosseteste, Basingstoke, Nicholas the Greek and minor assistants for a considerable time. The work as a whole consisted of four parts, the "Mystical Theology", the "Heavenly Hierarchy", the "Ecclesiastical Hierarchy", and the "Divine Names"[5] and its translation was probably the most painstaking and accurate piece of work produced by Grosseteste and his assistants. Not only the works were translated, but commentaries and annotations were written upon them, and these, as will be shown later, are of great importance in enabling us to judge of Grosseteste's proficiency in Greek[6].

The method used in both translating and commenting was to compare the original Greek text with several manuscripts of translations already prepared, and accept or reject as seemed best. This is clearly evinced by the frequency with which such expressions appear as, "Certain ones have translated it", "Different ones have translated it in different ways", etc.

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[1] See James' Article referred to in Note 5 of page 63

[2] Johannes Burgundio of Pisa about the middle of the twelfth century executed a series of translations from the Greek. Among them were the "Homilies" of Chrysostom "on Matthew", the tract of Nemesius "On the Nature of Man", and the treatise of John of Damascus "On the Orthodox Faith".

[3] Dionysius the Areopagite, the first Bishop of Athens, is mentioned in Acts XVII:34 as one of the Athenians who believed when they heard Paul preach on Mars Hill.

The author, date, and place of composition of the writings of the pseudo - Dionysius are unknown; but they must have been written in the fourth or fifth century. The writings are very strongly marked with Neo-Platonic teachings. They had a pronounced influence in the Middle Ages and reveal their author as a person of great speculative daring and religious insight.

[4] "Compendium Studii Philosophiae", page 474.

[5] Grosseteste's translation of the "Mystical Theology", with a commentary, isthe only one of the four that has been printed. The commentary is in the "Opera Dionysii Areopagitae"; Argent, 1503 pages 264b-271b. (See Stevenson: "Robert Grosseteste Bishop of Lincoln", page 223 and note.)

[6] For a full discussion of the importance of Grosseteste's connection with these works see Baur's introduction to Grosseteste's philosophical treatises, pages 31-43

The translation of these treatises probably came in Grossete's latter years when he had attained to his highest proficiency in Greek, and consequently he played quite an independent part in the work. Nicholas Trivet[1] says he "caused" the manuscripts" to be translated", but his share in the work was surely greater than that. He himself probably did the greater part of the translating and all of the commenting for the "Divine Names" and the "Mystical Theolcgy", and in the other treatises worked side by side with his assistants. At the close of the commentary on "Divine Names" he speaks of himself as translator and commentator, while in the commentary on the "Ecclesiastical Hierarchy" he speaks of his assistants. Moreover of this last named work he tells us that it was not a wholly new translation; that he took from preceding translations what seemed to be correct, but corrected or restored by his own translations many places where he saw mistakes in others. Thus he says, "We have used in the text now the words of this one, now of that one of those who have translated this book from Greek to Latin, and very rarely indeed we have used our own words where it has seemed more desirable and convenient for setting forth the idea of the author"[2] Surely from this statement we have a right to say that textual criticism had at least made a beginning with him and that he realized something of its importance. All in all, these pseudo- Dionysian translations must certainly be considered the most remarkable and the most enlightening of any with which Grosseteste's name can definitely be connected.

On the basis then of these various translations and commentaries, what judgment can we form in regard to Grosseteste's attainments as a Greek scholar? Was Bacon correct in ascribing only a very secondrate skill to him, or was Tyssington more nearly correct in his estimation of Grosseteste's proficiency when he said[3], "Set faith your Greek, if you know it better than Lincoln." Did he have a technical knowledge of the language, or only an ordinary reading knowledge? The question is not easily answered, and yet we have considerable evidence on which to form an opinion.

There can be no question but that he had at least a practical knowledge of the tongue, a knowledge sufficient to enable him to delve by himself into Greek works and gather the meaning and the lessons from them. In his letter to the Convent of Peterborough regarding the Monastic State[4], he speaks of reading the Greek manuscript

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[1] Nicholas Trivet, an annalist and chronicler (C1325). The citation is from his annals and is quoted by Stevenson (pg.224), but without giving the original reference.

[2] Taken from Baur's discussion of these works. See Note 6 pg.64

[3] "Confessio" in "Fasciculus Zizaniorem"; Ed Shirley, London 1858, page 152. (Baur's introduction to Grosseteste's philosophical works, page 38)

[4] Epistle 57. See page 59 of this thesis and note 3.

while seeking rest and recreation; and certainly no one without a practical knowledge of a language would expect to find rest or recreation in reading it. Also, the very fact of his translations, rough or finished, would be proof enough that he had an ordinary reading knowledge of Greek, and because these translations in his later years became more finished and more accurate, we feel sure that his knowledge was an increasing one.

Probably at the time of his first efforts Grosseteste had no more than a mediocre knowledge of Greek; but he had the humanistic interest in it, and his later works show evidence that he finally attained to a very creditable proficiency and considerable technical skill. The possession of this technical ability is shown more clearly in his translations and commentaries on the pseudo Dionysius works than elsewhere. Here he studied earnestly how best he might express the exact meaning of the Greek author in good Latin, and in all four of the works he resorts to frequent explanations and elucidations to bring out the particular shade of meaning most desired. For instance, when a Greek word may have several different renderings in Latin, he commonly sets down the Greek word, gives its various possible translations, and then seeks to pick out that rendering which will best express the meaning he believes was primarily intended. Where it is not possible to translate the Greek literally, or where a literal translation into Latin sounds rough, he departs enough from the literal translation to avoid crudeness, but interjects explanations and comments upon the Greek structure and syntax so that the reader may see just what changes he has made. To the work on the "Heavenly Hierarchy" he prefixed a sort of lexicon of synonyms on the ground that in a word for word translation, an expression that was clear enough in the Greek might become very ambiguous in the Latin unless just the right word was picked to express it.- A subtle meaning needs the exact word to bring out the right idea, and these exact shades can not be made obvious unless one has a considerable number of synonyms at his command.

As a prefix to the "Divine Names" an even more enlightening treatise is appended. Grosseteste has there inserted what can practically be called a grammatical introduction to the Greek language, short, yet complete enough to show considerable technical knowledge on the part of its author; and, as he tells us that he himself was both translator and commentator of this treatise on "Divine Names", this grammatical introduction must also be ascribed to him and not to his assistants.

In this short Grammar, Grosseteste treats of Greek phonetics, the vowels, dipthongs, pronunciations, rules of gender, syntax, compound words etc., a very great many things that he could not have discussed with any skill had he possessed only an ordinary knowledge of the language. Of special interest are the rules that he lays down for the translation of Greek compound words, a few simple principles that may bear repeating here.

"If the Greek compound has a corresponding and equivalent Latin compound, the Latin compound should always be used instead of two or more simple words."

"If there is no such equivalent Latin compound, then the Greek compound must be revolved into simple words of the same meaning".

"But if, when no regular Latin compound exists, one can still be formed according to Greek rules of composition, without treating the Latin too roughly, the forming of such compounds is permissible and desirable, because they set forth the exact shade of the Greek expression; as omnisciens, boniformiter, sacridecenter etc".

Clearly then, of a man who could do all these things, who could give rules of syntax and elucidations of Greek grammar, who could discuss Greek idioms and the differences between the Greek and Latin languages, who could attempt etymological explanations--even if they were weak in some points,--who could give a lexicon of synonyms for Greek terms and who could read Greek works for pleasure and recreation,--of such a scholar we must say that he had a very considerable knowledge of the language, a technical knowledge as well as a practical one. Roger Bacon may have been perfectly right in denying to him any proficience till the latter years of his life, but surely a real proficience was in time attained; and for the knowledge of Greek in his latter years, Tyssington's tribute is more nearly correct than Bacon's less hearty commendation. In this one regard at least Bacon probably underestimated the attainments of his well-loved master.

II. Hebrew:- On attempting to discover what knowledge Grosseteste had of the Hebrew language, the student meets with a grievous disappointment, because he can ascertain so little. And the disappointment is all the more intense because it is impossible to get away from the suspicion that he may have known much about it. Considering the language and the use that might be made of it for theological purposes, considering the past history of the Hebrews and how fully a knowledge of their tongue would lend itself to a search into the splendid records of a once great people, considering Grosseteste himself and his bent toward theology and also toward the general field of learning aside from theology, and considering the opportunities that it seems he might so easily have had for learning the tongue; one can not help believeing that Grosseteste must have had an interest in and a knowledge of Hebrew greater than we have the evidence to prove.

To Roger Bacon, of whose achievements in that language we know a little more[1], Hebrew appealed as the tongue in which God had revealed to himself to his chosen people, the language in which the earliest

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[1] In various places(for instance "Opus Majus" I Part c,pg 74ff; "Opus Tertium", pages 65 and 88; "Compendium Studii Philosophiae", page 480; et alia) Bacon indicates that he had a knowledge of Hebrew; and we know that he wrote a Hebrew Grammar, a fragment of which has come down to us. See Note 2, page 52.

sacred books had been written down following divine revelation. It was therefore the language in which the fountain of all wisdom must be sought, the language of the Bible and of the sages from whom all human knowledge issued. For that reason it merited most earnest attention, as it seemed wholly unfitting that these sacred works must be known and studied only in translations that oftentimes were weak and faulty, and not in the sacred language in which they were first revealed. It was a language, a knowledge of which was even more important for purposes of Biblical criticism than was the Greek, at least in so far as the criticism and correction pertained to the books of the Old Testament.

In this way the study of Hebrew appealed to Bacon[1]; and surely taking everything into consideration, it would not be wrong to maintain that Grosseteste held a very similar attitude. Indeed he shows something of this idea in a letter to the Countess of Winchester[2] when he speaks of the Jews as the ones to whom the law and the Prophets had been revealed and as a people worthy of consideration on that account.- Perhaps, if the whole truth were known, it was Grosseteste's views that prompted these ideas in Bacon's mind. And yet of course here, in the absence of positive evidence, we can only conjecture and surmise.

Any scholar who cared to study the Hebrew language could certainly find plenty of opportunities in this period of the Middle Ages. As Grosseteste learned Greek from Greeks, so he could easily have learned Hebrew from Hebrews. There were many important Jewries in England; Oxford itself possessed one of the largest and there were smaller ones in other points in Grosseteste's bishopric. Hebrew books were common and easily accessible, especially manuscripts of the Hebrew Scriptures. Jewish schools were to be found both at Oxford and in London, and though they were not to be compared with schools of the same people on the continent[3], still they were of sufficient importance so that their teachers could have served as competent instructors in Hebrew. Particularly was this so of the school at Oxford, and it is very probable that Grosseteste learned something of the language from the Jews there as well as from those in Paris. As Chancellor of the University of Oxford he doubtless more than once was brought into touch with Jews in matters of loans made to students; and later on as Bishop of Lincoln he often must have had dealings with them touching their financial relations with Monasteries and with the clergy[4]. So many ways there were in which he might have picked up a knowledge of Hebrew, and we can not believe that he overlooked them all.

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[1] For expressions of such ideas See "Opus Tertium", pages 32,80-81; "Opus Majus" I, part 3; page 66.

[2] Letter 5; page 35 of Luard's Edition of Grosseteste's letters.

[3] For instance the schools at Paris, Arles, Narbonne, Marseilles Etc

[4] See Stevenson: "Robert Grosseteste Bishop of Lincoln", pp.97-98.

Of course, as has been said above, the Jews were looked down upon, and it was by many considered a scandalous thing to have relations with them other than those of a financial nature; to sit at their feet for the purpose of study would be a most degrading performance. Indeed the Cistercian order had forbidden its monks to accept the aid of the Jews in learning Eastern languages[1], and the prejudice that such an order shows was very general, so general that most scholars, even if they did make an attempt to learn Hebrew and accepted aid from the Jews in doing it, would be apt to keep their knowledge a secret lest it bring them into disrepute. Grosseteste however, generally speaking, does not seem to have been a man who would let such considerations weigh with him. He certainly did not conceal his interest in the Jews, and while he condemned their usurious practices in regard to money-lending[2], he seemed to show a more kindly spirit toward them than was common in his day.

The two things that most clearly show Grosseteste's interest in these people were his translation of the "Testaments of the Twelve Patriarchs", a work which has been discussed above[3] and which he hoped would be instrumental in bringing about their conversion, and his writing, with the same end in view, of a treatise, the "Ceasing of the Law". This work widely known and read among his contemporaries and his successers in the next two centuries, has been called "A thirteenth century epistle to the Hebrews"[4], and that designation, together with its own title, gives a pretty clear idea of its content. It was meant to refute the Jewish notion of the permanence of the old Mosaic law, to point out the differences between the old dispensation and the new, and above all, to make emphatic the point that the old had been superceded by the new and that the Jews were free to accept the Christian religion. As far as we know, the treatise had little effect in bringing about conversions to Christianity, but it certainly shows Grosseteste's very keen interest in the Jews and a kindly spirit toward them. And since he had that interest and that spirit, we are very prone to believe that he surely used his contact with these people as a means of acquiring some knowledge at least of their language.

Have we any direct evidence to show that Grosseteste had such a knowledge? Nothing very definite, but still there are certain small facts that would seem to indicate such a conclusion; and among these facts the following may be noted:

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[1] See Stevenson: "Robert Grosseteste Bishop of Lincoln", page 22.

[2] Letter five; to the Countess of Winchester. Page 36 of Luard's edition of Grosseteste's letters.

[3] Page 62

[4] Stevenson: "Robert Grosseteste Bishop of Lincoln", page 105

On the authority of some statements of Leland[1], as cited by Tanner[2], we are told that Grosseteste began his study of both Greek and Hebrew at Oxford during his student days[3] there. On what actual sources this statement can be based we do not know; perhaps Leland had no authentic grounds for such an assertion, but still, in our uncertainty, the statement can not be wholly over-looked.

There is a tradition that Grosseteste received aid in his Hebrew studies from some Jewish rabbi connected with the Oxford school[4]. This of course is only tradition, yet it may represent an actual truth.

Nicholas Trivet in his annals (cited by Felten[5]) asserts that Grosseteste not only was familiar with the Hebrew tongue but that he brought to light many of the books of the Jews. Felten seems to accept this statement as correct, though he admits that evidence to prove it is lacking. However, the fact that Trivet was not a contemporary of Grosseteste and that in many of his statements he has been proven incorrect, precludes an acceptance of assertions in this regard unless they have other confirmation.

Both Trivet and Boston of Bury state that Grosseteste extracted much from the "Glosses" of the Hebrews[6]; but again the reliability of the statement is by no means certain and we can not accept it as conclusive.

Roger Bacon gives Grosseteste the credit for having some knowledge of Hebrew, but says[7] that he did not know it well enough to translate independently. This statement is probably correct, though

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[1] Leland, John(C1506-1552)-English scholar and antiquary. From 1534 or 1536 to 1542 he was engaged on an antiquarian tour of England and Wales in an effort to preserve manuscripts that had been scattered at the dissolution of various monasteries. His powers did not extend to the actual collection of the manuscripts, but he made many lists and notes upon the manuscripts, authors etc.

[2] Tanner, Thomas(1674-1735) English antiquary. His two chief works were his "Notitia Monastica", a short account of all the religious houses in England and Wales, and his "Bibliotheca Brittanico-Hibernica", a dictionary of all the authors who flourished in England, Scotland, and Ireland before the seventeenth century. On this he worked for forty years; published in 1748.

[3] Stevenson: "Robert Grosseteste, Bishop of Lincoln", page 17.

[4] Ibid, pages 97-98

[5] Felten: "Robert Grosseteste, Bischof von Lincoln", page 84, with a reference to page 598 of N. Trivet's annals.

[6] See Stevenson: "Robert Grosseteste Bishop of Lincoln", page 23. Trivet says Grosseteste was "in-triplici lingua eruditus: latina, Hebraea, et graecha; multa de glossis Hebraeorum extraxit et de graecc multa transferri fecit",- Trivet' s Annals; Ed. Hog, 1845; pg. 242.- (See Baur's introduction to Grosseteste's philosophical works, pg 5)

[7] "Compendium Studii Philosophiae", page 472. (In Brewer's Edition of "Opera Inedita")

it must be borne in mind that Bacon said the same thing of Grosseteste's knowledge of Greek, and there he probably underestimated. So it is possible that he underestimated in regard to his attainments in Hebrew as well.

A Franciscan writer of the fourteenth century, one Henry of Costessey who (c1336) wrote a commentary on the Psalms, had in his possession a copy of the text of that book in Hebrew with an interlinear translation in Latin[1]. This book was said to have formerly been the property of Grosseteste, and the statement is perhaps correct; the fact that Grosseteste himself wrote a commentary on the Psalms gives it some credence. But yet, even if the book used by Costessey had once belonged to Grosseteste, we can have no definite evidence that he personally made the translation into Latin.

Occasionally in works that can with all positiveness be ascribed to Grosseteste, he uses a Hebrew word, giving along side of it its Latin or Greek equivalent;as for instance in the "De Sphaera" he says that the diameter of the earth" in Latin is called the axis, but in Hebrew is called Magual[2]. And yet a few cases of that kind obviously can not be taken as a basis for attributing to him any extensive knowledge of the Hebrew.

All in all, from any evidence now obtainable we are clearly not warranted in ascribing to Grosseteste more than a superficial working knowledge of the Jewish language. Stevenson and Felten have probably exaggerated his abilities in that field, and Bacon's estimate is more likely the correct one. Until some further information can be discovered, we must feel that he did not fully avail himself of the opportunities that he might have had for the study of Hebrew. But that however need not be taken to mean that he did not feel the importance of that study; in all probability he did, but in his later years when that importance would impress him most, he was too much engaged in other things to devote himself very extensively to mastering the Jewish tongue.

III. Arabic:- It must be said that Grosseteste probably had very little acquaintance with this language,--not even a sufficient knowledge to enable him to do rough translating.--As has been brought out in another connection[3], he undoubtedly was familiar with the scientific writings of various Arabs, but these works were known to him only in Latin translations and not in the original Arabic. Therefore his knowledge of Arabic treatises and his acceptance of many of their scientific and mathematical ideas does not at all prove that he had any knowledge of their language. In spite of the fact that he seems to have derived much from the works of Arabic scholars, he here does not seem to have lived up to his belief that whenever possible recourse should be had to the original text.

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[1] James: "The Christian Renaissance" in Cambridge Modern History, Vol, I; pages 587 and 591.

[2] "De Sphaera", Ed. Baur; page 13.

[3] In connection with his work as a scientist; page 25 of this thesis.

Of course it is hardly to be maintained that he never saw an Arabic manuscript in the original and that not even a few words of that tongue were known to him.--Indeed in one treatise[1] he seems to be giving the Arabic name of a work of Albumzar; but still there is no evidence to indicate that he knew enough of the language to be of any practical value to him.---Roger Bacon says in one place[2] that the Arabic is of little use for theology, though of much use for philosophy and of some value for the conversion of the infidels;and perhaps Grosseteste held to the same opinion, and because he had the philosophical works of the Arabs in translations, and because he seems to have taken no very active part in missionary endeavors,aside from his work with the Jews, he may have thought that what he could get from a knowledge of the language would not repay him for the effort and time he would have to spend in learning it. But however that may be, unless new evidence is brought to light at some future time, we will have to say that he had practically no knowledge of this language and that he did little, if anything, to foster a systematic study of it.

IV.. French:- French undoubtedly was an acquired tongue to Grosseteste, though the fact that he learned it is neither important nor remarkable.--Accepting as almost certain his period of residence in Paris, granting as possible other visits there later on, and remembering that French was the language then spoken at the English court and by most of the upper classes with whom Grosseteste came much in contact, it is by no means strange that he knew the tongue; it rather would have been strange had he not known it.

It is, however, out of the ordinary that he should have written any works in that language, as it certainly was not the language commonly used for purposes of scholarship. We will probably have to say that Grosseteste himself did not put much importance upon his French writings nor consider them as scholarly works, while one can readily accept the opinion expressed by some unknown writer when, in a Latin introduction to one of Grosseteste's French works[3], he wrote, "Although the French language has not the savour of sweetness in the estimation of clerks, this work is intended for laymen who have less knowledge; and the wise reader who knows how to extract honey from a rock and oil from the hardest stone, will find the little work full of pleasantness"[4].

Several French works have been ascribed to Grosseteste[5], but only two of them can with any certainty be credited to him, the "Chasteau

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[1] "De Natura Locorum", Ed. Baur; page 72

[2] "Opus Tertium", page 88.(In Brewer's Edition of "Opera Inedita")

[3] The "Chasteau d'Amour".

[4] Quoted by Stevenson:"Robert Grosseteste Bishop of Lincoln",pg39

[5] Among them a "Manuel des Peches", which was probably the work of one William Wadington of whom little is known.--Also, the translation into English of a French treatise,"Walter of Henley's Husbandry",can not be ascribed to Grosseteste with any certainty, though some medieval manuscripts of it bear his name.

d' Amour" and the "Reules Seynt Roberd". The former, widely read during the thirteenth and fourteenth centuries, is a didactic, romantic poem having for its theme the fall of man and his later redemption, reminding one of the theme of Milton's great poems of the seventeenth century. It begins with an account of the creation of the world and closes with a picture of a world-conflagration, and the Judgment Day with the sorrows of Hell and the joys of Heaven. Many of the ideas and figures in it are taken from the realm of knighthood and chivalry, so that it can almost be characterized as a didactic work written in the style of a troubadour's song.-- It is interesting to note that Felten seems inclined to reject the authenticity of this poem as a work of Grosseteste,[1] though he says that some of Grosseteste's theological writings probably inspired it and that another merely put his ideas into poetic form. Dr. Felten, however, gives no satisfactory reason for his supposition, save that other French works once ascribed to Grosseteste are now rejected and hence perhaps this one ought to be also.-- Considering however the number of manuscripts of the poem that bear the name of this good bishop, and its undoubted acceptance in Grosseteste's own century, we are not justified in rejecting it unless better reasons can be given than have yet been brought forward.

The "Reules Seynt Roberd" is a work decidedly different from the "Chasteau d'Amour". It is merely a treatise concerned with husbandry and the management of an estate, supposedly written between 1240 and 1242[2] for the guidance of Grosseteste's friend, the Countess of Lincoln, who as a widow had the burdens of an estate upon her own shoulders. The rules laid down, going with much detail into all manner of questions connected with house and farm management, the control of servants etc., are of considerable interest as a side light upon Grosseteste's varied knowledge, but posses no importance to justify a discussion of them here. Nor indeed does Grosseteste's proficiency in French require any further notice, as it clearly was not used for any special purpose or to any important result.

How much credit then shall we give Grosseteste for his interest in literature, for his knowledge of languages and for his efforts to promote their study?-- Considering the relatively small number of those who in his day still retained the twelfth century interest in the Latin classics or who studied other languages at all, it seems that no little credit is rightly due him.-- Even today, a scholar who has a working knowledge of five languages wins our commendation; and Grosseteste had reached that point of attainment. Latin, French, English, Hebrew, Greek, were surely to some extent

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[1] Felten: "Robert Grosseteste, Bischof von Lincoln", pp-87-88

[2] The Countess of Lincoln, for whom the work was written, became a widow in 1240 and remarried in 1242. Hence it seems reasonable to ascribe the writing of the treatise to the period between those dates.

known to him, and perhaps indeed he had a slight knowledge of Arabic as well. His own achievements were by no means inconsiderable. As an impetus to the study of Greek particularly, he aided in the two things that needed most to be done,--in the bringing to England of Greek teachers and in the furnishing of Greek manuscripts on which to work. For other languages he did not do as much but he did do something. In relation to them all he was moved by the humanistic spirit and that spirit was not content with a merely passive interest in them.

And yet after all, what he himself did is not the really important thing. We must say here, as was said in regard to his work in the field of science[1], that it is not so much his own accomplishments for which we give him credit, as it is the spirit that he represents. In him we find blended the humanistic spirit of the twelfth century classical revival and the spirit of that later movement in which he was a pioneer, the movement toward the study of many languages. He saw in literature and languages a means by which the record of the past, with its lessons and with the experience and learning of the ancients, might become the heritage of his own and of succeeding days. He saw in the best works of every language attempts to uncover truth, and he realized the value of truth, no matter how or by whom it was revealed. In the Latin classics he saw a rich store-house of learning which was being closed to the people of his age because of a misconceived idea on the part of ecclesiastical leaders. In the study of other languages he saw a means by which knowledge might be sought at the fountain head, as a means by which faulty translations might be avoided and the original manuscripts in their pristine worth be made accessible. His work and his ideas undoubtedly influenced Roger Bacon in his philological endeavors, in his educational ideas, and in his demands for textual criticism and Biblical corrections. He stands out as a last son of the twelfth century-Renaissance, and at the same time has a place in the foreground of a thirteenth century "philological-humanistic movement[2], a movement to be sure that after running a brief course was retarded by other influences and so did not accomplish what it first gave promise of bringing about.- But Grosseteste's ideas were sound; he had the right conception of the value of the written page; he had the right conception of the importance of languages; he started on the right track to promote their study, and his own accomplishments were, at their lowest estimation, noteworthy and commendable.

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[1] Page 45

[2] The movement is so characterized by Baur in his "Das philosophische Lebenswerk des Robert Grosseteste"; page 64.

Conclusion.

An attempt has been made in this paper to give some conception of Grosseteste's greatness as a scholar rather than of his more commonly recognized greatness as an ecclesiast and statesman.--Particularly have we been concerned with his work as a scientist and as a humanist and linguist. We have no intention of saying that his achievements in either realm were of extraordinary importance in themselves, or that they had any very lasting results; and yet it does seem that because of what he accomplished and especially because of the spirit that he represents, he merits far more credit than has generally been granted to him. The very spirit that was active in him, these special interests that he felt, are among the things that have done most to bring about the progress and splendid intellectual achievements of our modern life. Surely we should remember him as one of the first to feel these vital influences. He paved the way for others. His example and his pioneering efforts might have made it possible for others to do along the lines he advocated a much greater work than he had done. Roger Bacon very clearly showed that influence, nor was he at all slow to acknowledge his indebtedness and his gratitude. But it happened-- a much to be regretted fact--that the main stream of scholarship was turned into other channels. Philosophy, Logic, Theology, gained the ascendency again; Thomas Aquinas in his lectures on the "Sentences" came into possession of the field and over-shadowed Grosseteste and his work, while the great religious struggles soon to break turned all men's minds away from those special fields into which Grosseteste had tried to lead them.

And yet this should not detract from his greatness; the fact that the seed of his planting did not bear immediate fruit was not his fault. He did his work, and under different conditions it would have had a far greater result. He stands out as one of the most notable English-speaking scholars of his time, and the tribute paid to him by Baur is well deserved. "On account of his many sided scientific interests, on account of his vast acquaintance with literature, on account of his numerous suggestions to enhance the study of languages, textual criticism, translations, experiment and observation, Grosseteste is assured of a place that can not be overlooked in the history of the intellectual development of the thirteenth century".[1]

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[1] Baur: "Das philosophische Lebenswerk des Robert Grosseteste", page 82.

APPENDIX I.

ARAB SCIENTISTS UNQUESTIONABLY KNOWN TO GROSSETESTE.

Appendix I.

I Avicenna: 980-1037. One of the greatest of the Arab philosophers. He wrote commentaries on Aristotle's works as well as independent treatises. His Metaphysics has been published(Venice 1499), but it is only a portion of his greater work, the "Sufficientiae "treating of Logic, Mathematics, Physics, and Metaphysics. See De Wulf: "Histoire de la Philosophie Medievale", (1912)pg. 276, and Vogl: "Die Physik Roger Bacos", pg. 31. Grosseteste refers to him in "De Natura Locorum". (No attempt is here made to give more than one place in which Grosseteste refers to these various Arab scientists, though he cites some of them very frequently.)

II Averroes: 1126-1198. Probably the chief Arab commentator on Aristotle. Most of his work was done at Cordova. It was quite largely through his translations and commentaries that the "New Aristotle" became known to Paris, and, because he emphasized some of the anti-christian elements in the "Philosopher", the wave of skepticism following this introduction was called "Averroism". See Vogl: "Die Physik Roger Bacos", pg. 32.--Grosseteste refers to him in "De Calore" and "De Natura Locorum".

III. Albumazar: C880. Lived at Bagdad and was especially noted for his studies in Arithmetic, Geometry, Astronomy, and Astrology. He wrote a "Liber conjunctionum seu de magnis conjunctionibus" and also an "Introductio ad Astronomiam". See Suter: "Die Mathematiker und Astronomer der Araber und Ihre Werke" (Leipzig 1900) pp. 28-29. Grosseteste refers to Albumazar in the "De Natura Locorum".

IV Messalahe: C815. An Arab Jew. Little is known of his life, but he worked at Bagdad. Many works on Astronomy and Astrology are credited to him. (Suter, pp. 5 and 6) Grosseteste speaks of him in the "De Natura Locorum", referring to his "Liber de Speculis"

V Alpetragi: Born near Cordova about 560. Later lived and wrote at Seville. An Astronomer of note. His "Theoria Planetarum" was translated into Latin by Michael Scot(C1217) and was well known to Latin scholars,including Bacon and Grosseteste. (Suter, pg.131) Grosseteste refers to him in the "De Natura Locorum".

VI Thebit (836-901):- A great physicist, philosopher, and astronomer. Was born in Mesopotamia, but most of his life was spent at Bagdad. He was not a Mahommedan, but it is doubtful whether he ever accepted Christianity. He translated many Greek works into Arabic(Archimedes, Euclid, Galen, Hippocrates, Aristotle and others), and wrote in Arabic "The Procession of the Solar Periods" and other treatises. (See Vogl: "Die Physik Roger Bacos", pg.32.) Grosseteste refers to him in the "De Sphaera".

VII Haly (C1100). Born at Cordova and did most of his work there, though a part of his life was probably spent in Africa. He wrote on Medicine, Astronomy, and Astrology. His best known work was a Meteorology, and it was that book on which Grosseteste largely based his "De impressione Aeris". (See Suter: pg. 100)

VIII Albategni (850-929):- Called "the Arabian Ptolemy". He wrote on Astronomy and Astrology, among other works producing a commentary on Ptolemy and a book of "Sentences" connected with Astronomy. Most of his work was done at Bagdad. He reckoned the

tropical year at 365 days - 5 hours- 46 minutes-24 seconds, an error of scarcely more than two minutes according to modern computations. (Suter: pp. 45-46). Grosseteste used his work in connection with his "Computus" and his "Kalendarium". See Kaltenbrunner: "Vorgeschichte der Gregorianischen Kalendarreform", pg. 312.

IX Arzachel (C1029-1087) Born at Cordova. An Astronomer of note and the inventor of several astronomical instruments. He compiled tables and rules for astronomical purposes, known as the "Canons of Arzachel". Grosseteste used him in connection with his "Computus" and his "Kalendarium". See Kaltenbrunner, pg. 312, and Suter pp. 109-110.

X Alfragan (C833). He was Director of the Observatory at Bagdad and, as such, wrote various treatises on Astronomy. A commentary on the "Almagest", an "Elements of Astronomy", a treatise on the construction of the Astrolabe etc. are from his pen. He relied much on Ptolemy. He was the first to make known to Western Europe the Arabic calendar. Grosseteste used his works in connection with the "Computus" and the "Kalendarium". See Kaltenbrunner, pg. 312, and Suter, pp. 18-19.

It is not of course to be inferred that these are all of the Arab sources with which Grosseteste was acquainted. In all probability he knew several others, but these are all that the writer of this paper has positive evidence to believe were known to him. Vogl gives the names of seventeen Arabs who were known to Bacon, and it surely would not be a very rash conjecture to say that all these were also known to Grosseteste.

APPENDIX II.

THE TABLE OF CONTENTS OF GROSSETESTE'S "COMPUTUS."

TABLE OF CONTENTS OF THE "COMPUTUS."

Chapter I ---- The cause of the intercalary day; means for verifying our calendar; a plan for finding the intercalary year.

Chapter II --- The division of the year into four seasons or twelve months; the division of the months into Kalends, Nones, and Ides.

Chapter III -- The courses of heavenly bodies and their cycles; solar laws and the advantages of harmony among the heavenly bodies.

Chapter IV --- A setting forth of our error in finding the new moon dates, and a method of finding them accurately.

Chapter V ---- The means of computing the years and months of the Arabs and the years of the Christians by multiplication and division, as well as by tables.

Chapter VI --- What is necessary in a computation in order not to cause a difference in the time of a true lunation and of an artificial lunation.

Chapter VII -- The length of a lunation according to our calendar, and the cause of intercalary days; lunar rules and their utility.

Chapter VIII - How sixteen years equals just five hundred and forty lunations, which we figure out by going over those years. How intercalary days and leap years are figured out, and when leapyears come in our calendar. How to ascertain by tables the time of the full moon of each month.

Chapter IX --- The means for determining on the golden number in the calendar.

Chapter X ---- Our error in setting the bounds and dates of changeable feast days, and how to set these bounds and dates according to the principles of our calendar.

Chapter XI --- How to compose tables for finding moveable feast dates.

Chapter XII -- The times for fasting.

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Vol. I Gives something of a background according to which Grosseteste's services in the realm of Science can be estimated.

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